



DRAFT

2019-2023

Capital Investment Plan Update

Letter from the Secretary & CEO



**Stephanie
Pollack**

On behalf of the Massachusetts Department of Transportation (MassDOT) and the Massachusetts Bay Transportation Authority (MBTA), I am pleased to present this 2019-2023 Capital Investment Plan (CIP) Update. This Plan continues significant and sustained investment in the transportation infrastructure that serves residents and businesses across the Commonwealth. This document also reflects the ongoing transformation of the CIP process as MassDOT and the MBTA seek to reinvent capital planning for the Commonwealth's statewide, multi-modal transportation system.

Improvements to the capital planning process in this CIP update include: additional refinements to the Planning for Performance (PfP) tool to incorporate new asset data; development of the Transportation Asset Management Plan (TAMP) for the Highway Division and the Transit Asset Management plan (TAM) for the MBTA and the Regional Transit Authorities (RTAs); and improved methodology to allow for year-over-year comparison and consistent metrics for analysis of the equitable distribution of investments. The TAMP and TAM plans reflect a ten-year time frame and will inform investment decisions across the Commonwealth.

A new economic impact methodology for scoring projects, which is in development for the 2020-2024 update, will be informed by the Baker-Polito administration's Housing Choice Initiative, which is currently underway.

The portfolio of strategic investments contained in this CIP update continues to be organized into three important priority areas: system reliability, asset modernization, and capacity expansion. These priorities form the foundation of not only this plan, but of a vision for MassDOT and the MBTA to provide all Massachusetts residents, communities, and businesses with access to safe and reliable transportation options.

The allocation of funds contained in this CIP reflects this priority-driven investment strategy. About 50 percent of the \$17.8 billion in total capital investments over the next five years will go to improve the reliability of the core transportation system. Another 28 percent is to modernize existing assets so that they can better accommodate current or anticipated growth and meet today's demands, such as increased accessibility and safety requirements that may not have existed when these assets were initially planned and constructed.

This CIP will also fund continued study, permitting, and/or design of several complex and regionally significant projects, including the expansion of Boston's South Station, the South Coast Rail project, the multi-modal reconstruction of the I-90 interchange in the Allston area of Boston, and the I-90/I-495 interchange in Westborough. Overall, only 12 percent of this CIP has been set aside for the physical expansion of the transportation system. Of the approximately \$2.0 billion for expansion investments, about \$1.4 billion is set aside for the Green Line Extension project.

This plan was shaped by careful planning and prioritization work as well as by public participation. In building this plan, MassDOT and the MBTA collected and benefited from comments and recommendations from transportation partners and stakeholders, elected officials, and others. I thank all of those who participated for their continued interest in transportation investment.

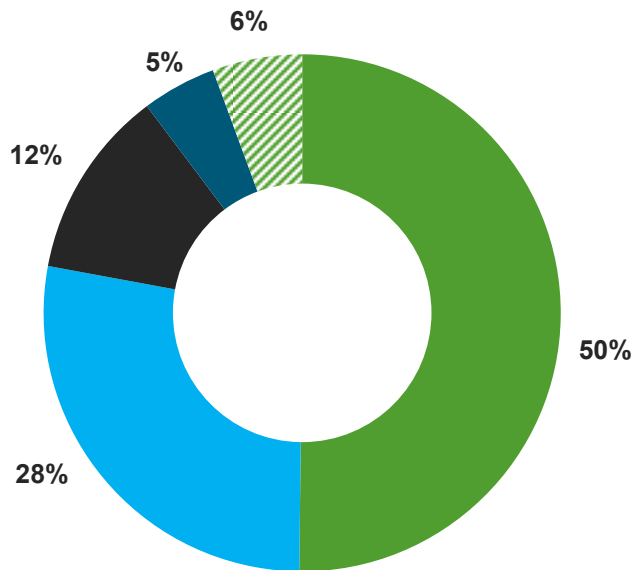
This CIP and its implementation reflect the continued commitment of MassDOT and the MBTA to identify and complete projects that are of the highest benefit to residents and businesses across the Commonwealth. MassDOT will continue to monitor and benchmark progress toward meeting statewide transportation goals.

I look forward to continuing to work together toward these shared and important goals.

Program investments by Division

Aeronautics	Highway	IT	MBTA	Rail	RMV	Transit	OTP	Total SFY19 23
\$269.3 (millions)	\$4,411.6	\$59.5	\$3,775.4	\$252.4	\$1.1	\$169.9	\$4.6	\$8,943.7
Aeronautics	Highway	IT	MBTA	Rail	RMV	Transit	OTP	Total SFY19 23
\$25.0 (millions)	\$1,768.8	\$43.7	\$2,934.3	\$59.4	\$67.5	\$42.7	\$0	\$4,941.4
		Highway	MBTA	Rail	OTP	Total SFY19 23		
		\$488.7 (millions)	\$1,422.5	\$139.0	\$60.0	\$2,110.2		

Overall program budget breakdown



<i>millions</i>	SFY 2018- 22	SFY 2019- 23	Differences
Reliability	\$9,790.2	\$8,943.7	-\$846.5
Modernization	\$3,280.5	\$4,941.4	+\$1,660.9
Expansion	\$2,213.4	\$2,110.2	-\$103.2
Chapter 90	\$1,000.0	\$1,000.0	-
Planning, Enterprises Services, & Other	\$910.4	\$827.8	-\$82.7
<i>Five-year total</i>	\$17,194.6	\$17,823.1	\$628.5

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Notice of nondiscrimination rights and protections to beneficiaries

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MassDOT, Title VI Specialist, Office of Diversity and Civil Rights
10 Park Plaza
Boston, MA 02116
857-368-8580
TTY: 857-368-0603
MASSDOT.CivilRights@state.ma.us

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Massachusetts Commission Against Discrimination (MCAD)
One Ashburton Place, 6th Floor
Boston, MA 02109
617-994-6000
TTY: 617-994-6196

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Office of Diversity and Civil Rights
Massachusetts Department of Transportation
10 Park Plaza – 3rd floor
Boston, MA 02116-3969

Phone: 857-368-8580

TTY: 857-368-0603

Fax: 857-368-0602

Email: MASSDOT.CivilRights@state.ma.us

Office hours: 9:00am to 5:00pm

This notice is available from the Office of Diversity and Civil Rights in large print, on audio tape, and in Braille upon request.

Capital planning approach

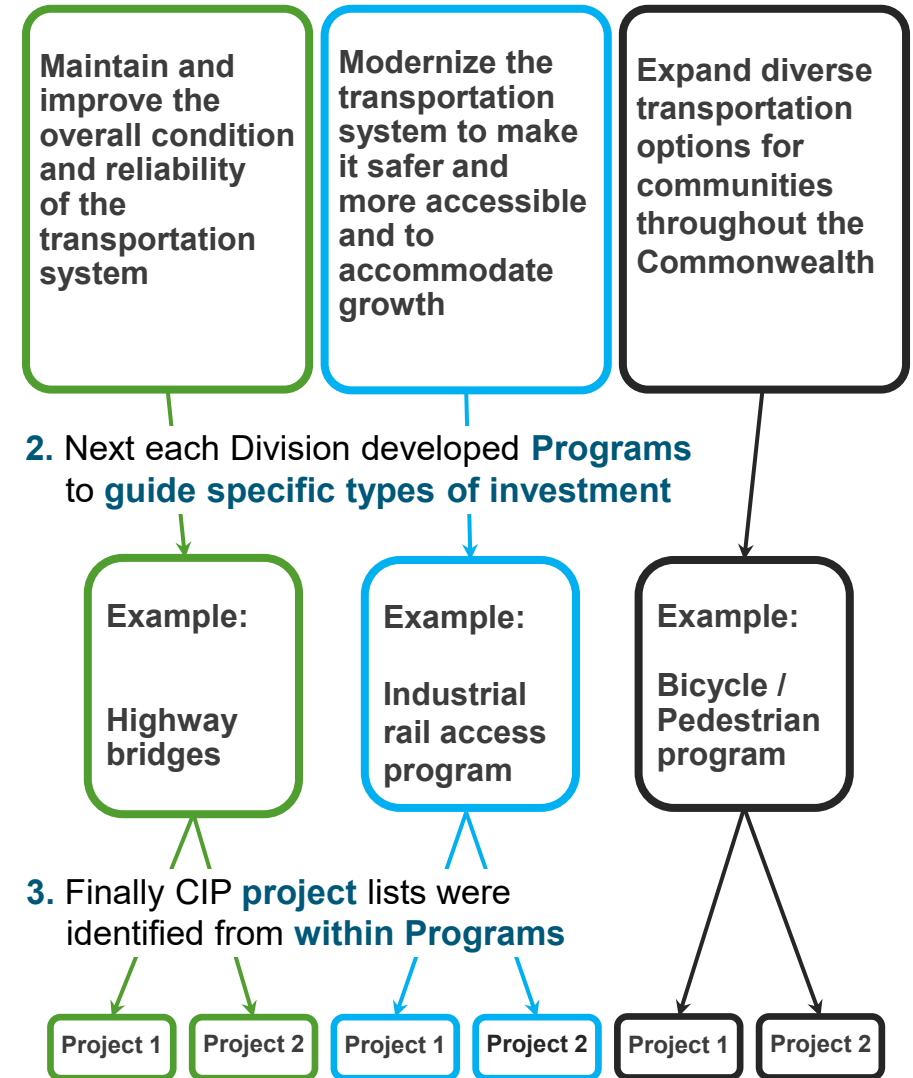
This MassDOT/MBTA Capital Investment Plan (CIP) update for fiscal years 2019-2023 represents a sustained shift in the process of capital budgeting at MassDOT and the MBTA. Prior to the 2017-2021 CIP, transportation capital plans consisted almost entirely of long lists of funded projects. Previous plans included little strategic context and even less demonstrable evidence that the investments chosen out of thousands of possible projects would best accomplish the overall goals of the agency and of the Commonwealth.

This CIP is different in fundamental ways: it continues to be informed by a strategic vision, influenced by public and stakeholder input sought from the beginning of the process, built around funding programs, and projects were selected based on an objective and comparative evaluation.

For this update, there was three-pronged approach to public and stakeholder engagement. Phase 1 focused on stakeholder engagement with established stakeholders and groups as well as the identification of new, stakeholders across all MassDOT and MBTA divisions. In addition, social media was utilized to highlight transportations investments completed under prior CIPs as well as ongoing efforts under the 2019-2023 CIP.

Phase 2 will focus on input from the general public through the online commenting tool and public meetings across the Commonwealth (consistent with past years). Finally, all comments are analyzed using qualitative data analysis software and relevant comments are provided to divisions for further input and response. Major themes are documented and incorporated as part of the final CIP.

1. **Strategic priorities** come first, expressing DOT's **broadest goals**



Priorities

The three priorities for CIP investment are, in order of importance: Reliability, Modernization and Expansion. These priorities express the broadest goals for MassDOT and MBTA investments. Approximately 50% of the investments in this CIP update are for improvements in system reliability, followed by 28% for modernization of transportation assets and finally 12% for expansion of the transportation network. The remaining investments support our municipal partners' transportation needs through the Chapter 90 reimbursement program and the agency's Planning and Enterprise Services.

1 Reliability

Maintain and improve the overall condition and reliability of the transportation system

- ▶ Necessary routine and capital maintenance
- ▶ State of Good Repair projects designed primarily to bring asset condition up to an acceptable level
- ▶ Asset management and system preservation projects

2 Modernization

Modernize the transportation system to make it safer and more accessible and to accommodate growth

- ▶ Compliance with federal mandates or other statutory requirements for safety and/or accessibility improvements
- ▶ Projects that go beyond State of Good Repair and substantially modernize existing assets
- ▶ Projects that provide expanded capacity to accommodate current or anticipated demand on existing transportation systems

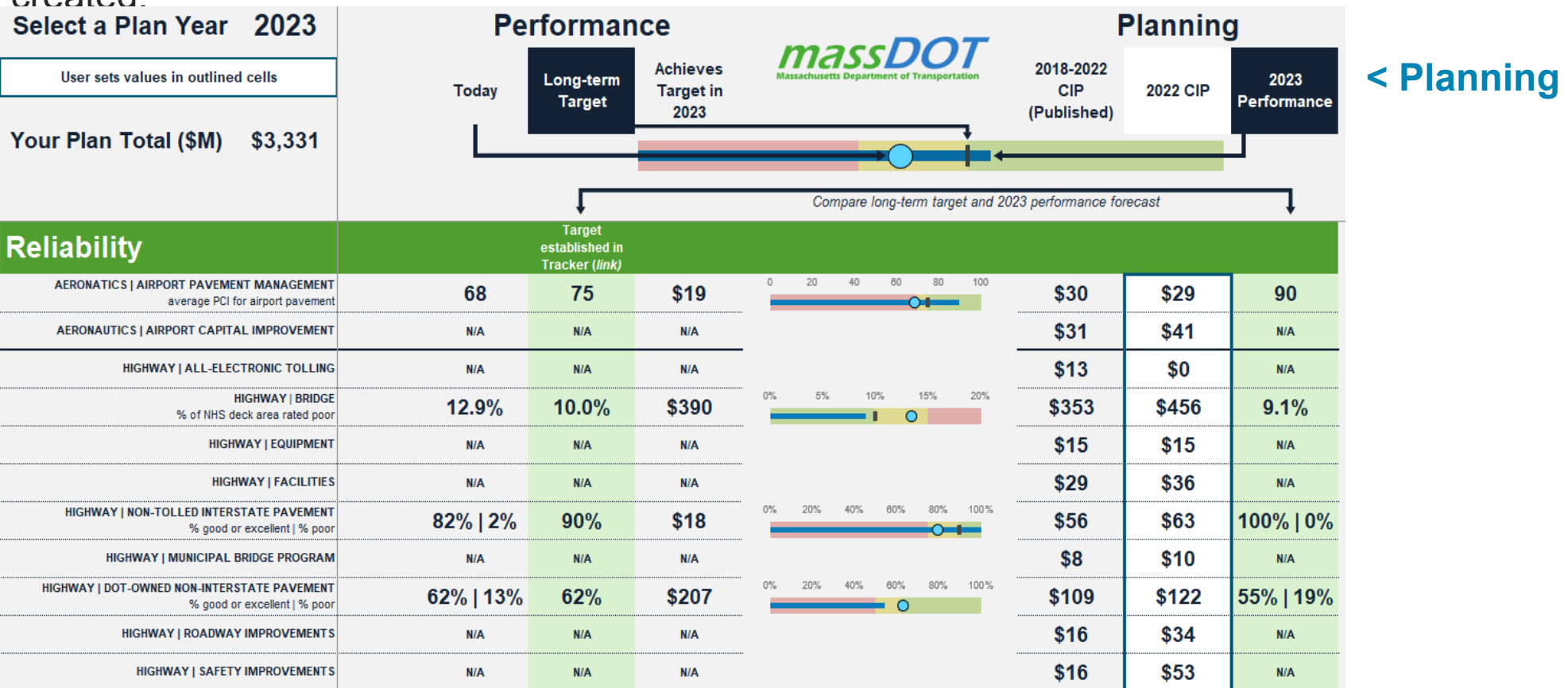
3 Expansion

Expand diverse transportation options for communities throughout the Commonwealth

- ▶ Projects that expand highway, transit and rail networks and/or services
- ▶ Projects that expand bicycle and pedestrian networks to provide more transportation options and address health and sustainability objectives

Programs

MassDOT and the MBTA established funding programs under each priority. These programs encompass the most important capital responsibilities of the agency, including repairing pavement and bridges, purchasing new subway cars, upgrading runways at municipal airports, along with many other activities. This CIP update improves on the connection between programs and asset management. Some programs were refined so they more concretely accounted for the assets under their purview, while other programs were replaced or newly created.



Each Division of MassDOT requested initial funding allocations for each program based on a variety of inputs, including existing multi-modal asset management systems, output from the Planning for Performance Tool—which was custom built for MassDOT—and public input and staff recommendations. Program budgets are set to ensure that they are sufficient to cover projects already underway.

The PfP tool will evolve over time as MassDOT continues to improve and expand its asset management data across the agency's divisions. MassDOT is working to develop performance goals and targets for each program and to measure actual performance against the predictions of the PfP tool. In this year's edition of the PfP tool, available target information from MassDOT's 2017 annual performance management report Tracker, has been added into the tool.

As part of this effort, MassDOT is working on a Transportation Asset Management Plan (TAMP) for MassDOT and a Transit Asset Management Plan (TAM) for the MBTA and the RTAs both of which reflect a ten year timeframe. Both plans will inform future investment decisions across the Commonwealth in conjunction with PfP and Tracker. This will result in more refined program sizing in future CIPs.

Projects and scoring

Only once programs are defined and budgets are sized—based on the priority of the program, the types of funding available for it, and the ability of the program to move the agency towards its strategic goals—are individual investments considered for funding. Projects are selected from a “universe of projects,” which was initially developed for the 2017-2021 CIP by MassDOT staff based on all known project ideas, and shared with the public in 2016. The “universe of projects” is continually updated as new ideas/projects are identified. Projects are scored using either the evaluation process recommended by the independent Project Selection Advisory Council (PSAC) or by one of several asset management systems employed by the MassDOT Divisions. For this CIP update the scoring criteria (social equity and economic impact) were refined for the MBTA to incorporate factors related specifically to transit oriented investments and impacts on communities. Projects were selected for funding based in part on their scores as well as other criteria.

One of the most important program areas in this CIP, State of Good Repair investments, is not scored through the evaluation system recommended by PSAC. Rather, such investments are prioritized using existing asset management systems that help each MassDOT Division and the MBTA monitor system conditions and prioritize investments based on, among other factors, condition, usage, asset criticality, and maintenance and life-cycle cost impacts. Over time, MassDOT plans to increase both the rigor and the transparency of these asset management systems so that State of Good Repair programs and projects can be more easily prioritized and compared to other types of projects. MassDOT and the MBTA are currently preparing asset management plans (TAMP and TAM) as required by FHWA and FTA, respectively on the condition of our transportation assets.

For the Highway TAMP, the focus is on bridge and pavement condition for the National Highway System (NHS). Investment levels for bridges were considered which achieve condition on the basis of bridge area (versus number of bridges) – specifically square footage of bridge deck area in good/poor condition over time. For pavement (interstate and non-interstate) annual investment levels on the NHS (14% of lane miles in the Commonwealth) were analyzed to assess long term pavement condition (percent lane miles in good or excellent condition). A draft TAMP was submitted to FHWA in April 2018.

Under the TAM, the MBTA is preparing a transportation asset management plan that covers all assets owned and/or managed by the MBTA and used to provide public transportation services. Plan will include performance targets to be achieved and life cycle management needs. Draft report is due October 2018 to FTA.



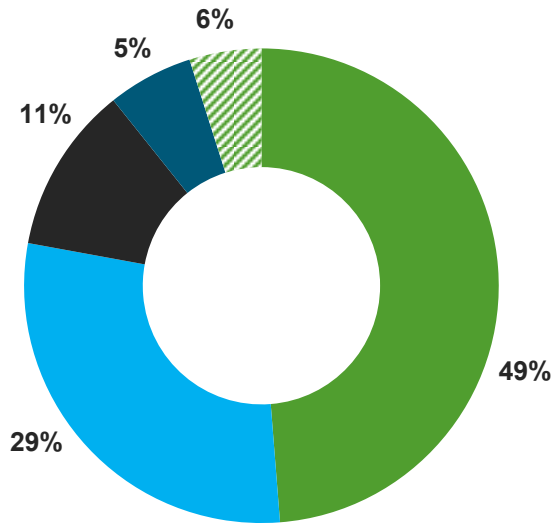
This is the third CIP which prioritizes investments using project scoring. For this CIP update, criteria weights were refined. This scoring approach was used across all the Divisions, helping to establish a systematic way to more transparently advance the projects that best achieve desired goals.

Evaluation criteria	Description	Highway	Rail	Transit	Aeronautics	IT/RMV
System preservation	<i>Projects should contribute to a state of good repair on the transportation system</i>	15	10	15	20	Employ IT criteria that focuses on business value and operations impact, but also takes into account ability to support these goals
Mobility	<i>Projects should provide modal options efficiently and effectively</i>	20	20	25	15	
Cost effectiveness	<i>Projects should result in benefits commensurate with costs and should be aimed at maximizing the return on the public's investment</i>	10	10	10	10	
Economic impact	<i>Projects should support strategic economic growth in the Commonwealth</i>	10	20	15	10	
Safety	<i>Projects should contribute to the safety and security of people and goods in transit</i>	15	20	10	25	
Social equity & fairness	<i>Projects should equitably distribute both benefits and burdens of investments among all communities</i>	10	10	10	5	
Environmental and health impacts	<i>Projects should maximize the potential positive health and environmental aspects of the transportation system</i>	10	10	10	10	
Policy support	<i>Projects should get credit if they support local or regional policies or plans; or state policies not addressed through other criteria</i>	10	5	5	5	



Investments overview

Overall spending by priority



The 2019-2023 CIP update continues the investment strategy of the prior CIP. A majority of funds go toward the reliability and modernization of our transportation system, and modest investments are made in expansion of the system. Presented to the left and below is an overview of investments across priority and Division.

Please continue in order to explore highlighted investments included in the 2019-2023 CIP update.

Overall spending by priority

Overall spending by priority by Division (in \$ millions)

Spending Priority	% of Total Spending	Aeronautics	Highway	IT	MBTA	Rail	RMV	Transit
1 / Reliability	49%	\$266.8	\$3,941.5	\$57.5	\$3,732.8	\$249.4	\$1.1	\$121.9
2 / Modernization	29%	\$25.3	\$1,815.2	\$43.9	\$2,938.8	\$53.4	\$66.9	\$60.8
3 / Expansion*	12%		\$471.2		\$1,288.9	\$137.0		
Planning & Enterprise Services	5%							
Chapter 90	6%		\$1,000.0					

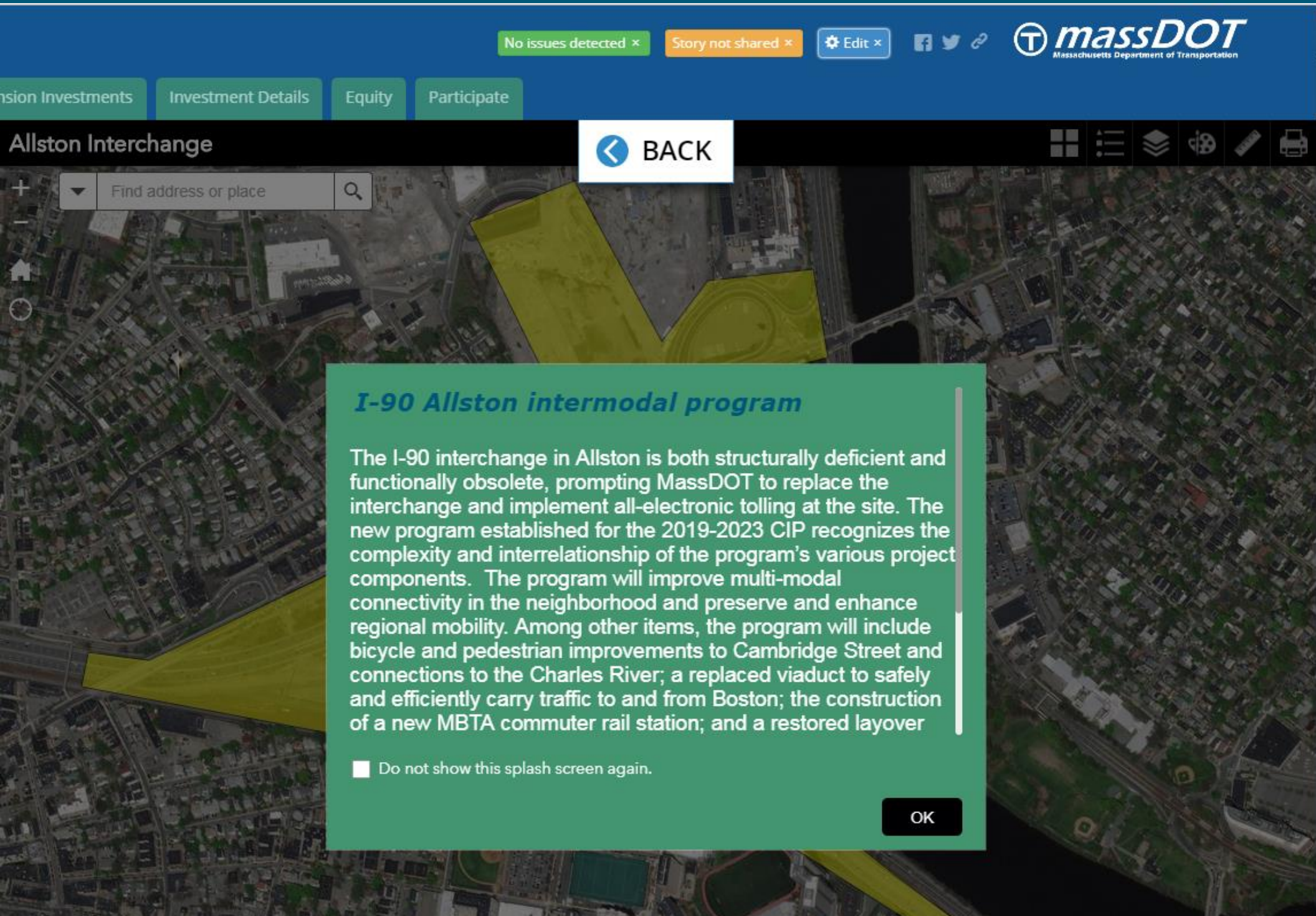
*Includes Bicycle and Pedestrian Modal Implementation program spending under Highway that is programmed in Planning & Enterprise Services

Major Investment Highlights

- Allston multi-modal program
- Route 79 – Fall River
- Route 20 improvements project – Charlton/Oxford
- Green line extension
- MBTA Investments
 - Red line / Orange line improvements program
 - Commuter Rail safety and resiliency program (PTC)
- Rail and Transit
 - Transit Investments
 - Rail / South Coast Rail program
- Registry of Motor Vehicles
 - ATLAS
- Aeronautics



Allston multi-modal program



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Division Investments

Investment Details

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Allston Interchange

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I-90 Allston intermodal program

The I-90 interchange in Allston is both structurally deficient and functionally obsolete, prompting MassDOT to replace the interchange and implement all-electronic tolling at the site. The new program established for the 2019-2023 CIP recognizes the complexity and interrelationship of the program's various project components. The program will improve multi-modal connectivity in the neighborhood and preserve and enhance regional mobility. Among other items, the program will include bicycle and pedestrian improvements to Cambridge Street and connections to the Charles River; a replaced viaduct to safely and efficiently carry traffic to and from Boston; the construction of a new MBTA commuter rail station; and a restored layover

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Route 79 / Fall River

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Route 79 - Fall River

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Route 79 – Fall River

MassDOT previously completed a study of the Route 79/Davol Street Corridor to examine how to best balance multimodal transportation needs and improve connectivity while supporting economic development. The recommended long-term alternative brings Route 79 to an at-grade urban boulevard with a wide, landscaped median, providing local access to the waterfront and to Route 79. A shared-use path will be located along the eastern and western sides of the corridor, connecting to the existing Veterans Memorial Bridge shared-use path to the north and to the I-195 / Route 79 Interchange Project's shared-use path to the south. About ten newly created acres will promote economic development for the region. This project is currently in the design phase.

[Click here to visit the Route 79 - Fall River project website.](#)

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Route 20 improvements – Charlton/Oxford

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Route 20 Improvements Project - Oxford/Charlton

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Route 20 improvements project - Charlton/Oxford

A high-priority safety project, the improvement of Route 20 includes 3.2 miles of roadway infrastructure and safety upgrades in Charlton/Oxford. The project will modernize the corridor by improving the median barrier, roadway geometry, and traffic operations from the intersection of Routes 12 and 20 in Oxford up to and including Richardson's corner in Charlton. Also included is replacement of bridge O-06-002 over the French River and rehabilitation of bridge C-06-023 over the Little River. This project is scheduled to advertise in FY 2020 utilizing a design-build procurement and anticipated to start construction FY 2021.

[Click here to visit the Route 20 improvements project website.](#)

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Green line extension program

[Mission Investments](#)[Investment Details](#)[Equity](#)[Participate](#)[Message about Web Security and Story Maps](#)[LEARN MORE](#)

Green Line Extension

Phase I and Phase II are shown

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Green Line extension

The MBTA GLX project is a 4.7-mile light rail line, which will extend the current Green Line service, from a relocated Lechmere Station in East Cambridge, Massachusetts, to a terminus at College Avenue in Medford, Massachusetts and a spur to Union Square in Somerville, Massachusetts. This project is moving forward with a new cost estimate of \$2.28 billion and the available federal and Commonwealth funding of \$1.99 billion along with pledged contributions for the project totaling approximately \$296 million from the cities of Cambridge and Somerville (\$75.0M) the

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Red / Orange line improvements program

This program includes all investments related to replacing and expanding the Red Line and Orange Line fleets and upgrading the facilities and infrastructure needed to support the new vehicles. When fully implemented, these investments are expected to produce three minute headways on the Red Line and three and a half minute headways on the Orange Line.

The 120 Orange Line fleet and 218 Red Line fleet will be completely retired and replaced with a larger fleets of 152 and 252 new vehicles, respectively. This initiative requires an extensive update and modernization of the existing Orange Line Carhouse at Wellington Yard in Medford and Red Line Carhouse at Cabot Yard in South Boston. Additionally, the Wellington and Cabot Yards will be upgraded to include associated track, signal and power improvements. The Orange Line Test Track will be brought up to a State of Good Repair, and a new Red Line Test Track will be built in order to meet the testing and commissioning needs of the new fleets. The Signals Systems Upgrade Program will deliver the Design Build project implementing upgrades to the signaling systems for both the Red Line and Orange Line, the Columbia Junction signal replacement project (Phase 2); and the Southwest Corridor wayside appurtenance work. It will also deliver signal enhancements on both the Orange and Red Lines in order to reduce Electromagnetic Interference (EMI). Final completion for infrastructure improvements is scheduled for February 2022 and final completion for fleet replacement is scheduled for September 2023.



Commuter rail safety and resiliency program

The Commuter Rail Safety and Resiliency program includes investments to improve the safety and resiliency of the Commuter Rail system, including the implementation of Positive Train Control (PTC).

PTC is a strategic initiative of the MBTA aimed at meeting the Federal Mandate to have an operable PTC system in place throughout the MBTA's entire commuter rail system by no later than December 31, 2020. The Rail Safety Improvement Act of 2008 mandated that certain freight and commuter rail lines – including the MBTA's Commuter Rail system and freight lines – install PTC by December 31, 2015. In October 2015, the deadline was extended by Congress to December 31, 2018, with the ability to receive additional extensions through December 31, 2020 by meeting key milestones. PTC is defined as a safety system designed to prevent train-to-train collisions, over-speed derailments, incursions into established work zone limits, and movement of trains through track switches that may have been left in the incorrect position. The MBTA PTC System shall include the following elements:

- Wayside – Additions to the existing signal system that include transponders within the tracks (transmitting data to the train as it passes over), antennas, upgraded hardware and software in the existing signal houses/cases or the installation of new houses/cases as required
- Back Office – Upgraded hardware and software within the MBTA's Dispatch and Control Centers.
- On-Board – Upgraded radios and hardware on all locomotives and control cars
- Communications – Reliably connecting the On-Board, Back Office, and Wayside segments via wireless (220 MHz radios) and a ground based network (fiber optics)

A PTC Implementation Plan that has been approved by the Federal Railroad Administration requires the installation of hardware on all MBTA Commuter Rail lines and Revenue Service Demonstration on two pilot lines (Stoughton and Lowell Lines) by the Fall of 2018 with full PTC implementation in line with mandate requirements (December 31, 2020).

South Station expansion

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Expansion Investments

Investment Details

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South Station Expansion

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South Station Expansion

In cooperation with the Federal Railroad Administration, Amtrak, and the MBTA, MassDOT is studying and designing the expansion of South Station. The project will expand the rail service into and passenger capacity at South Station, including additional tracks and platforms and improved signal systems and passenger facilities. This project will enhance the station and streetscape environments for pedestrians, bicycles, and rail passengers and includes the reopening of a section of Dorchester Avenue along the waterfront that has been closed to the public for decades. MassDOT has

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Rail & Transit

Transit investments

- ▶ Cottage Street Operations & Maintenance Facility, Springfield, MA – This \$55.7 million dollar state investment currently under construction will result in a 227,500 square foot modernized maintenance, storage and operations center for Pioneer Valley Transit Authority (PVTA), the second largest transit authority in Massachusetts. The facility will provide light and heavy duty maintenance to PVTA's entire fleet of buses and para transit vehicles. The facility will replace PVTA's existing maintenance facility which, in addition to being more than 100 years old, is both operationally inefficient and undersized. The new maintenance facility will be designed for energy conservation and sustainability, and will be LEED Certified. The facility is scheduled to be completed in FY 2019.
- ▶ Replacement Vehicles – Eighty-eight transit buses will be replaced in FY18 as part of a multi-year bus replacement strategy. This state investment in transit bus replacement continues MassDOT's commitment to ensuring a state of good repair for the regional transit authorities' transit fleets.

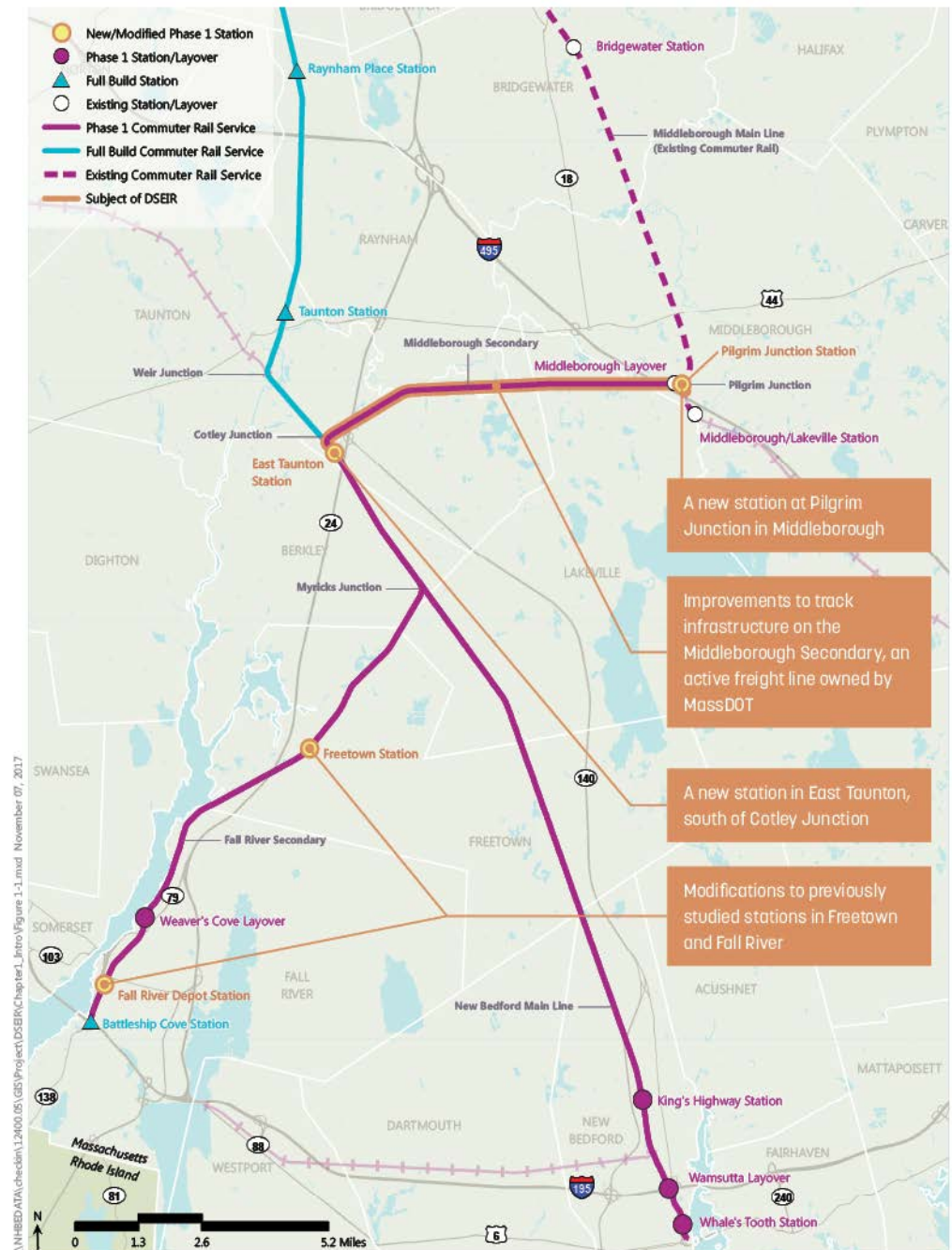
Rail / South Coast Rail program

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The Commonwealth is committed to moving forward with the South Coast Rail project to serve the existing and future demand for public transportation between Fall River/New Bedford and Boston, enhance regional mobility and support smart growth planning and development strategies in Southeastern Massachusetts.

The project utilizes a phased approach to deliver service while proceeding with the design and permitting of the Stoughton Electric Full Build alternative. Phasing will shorten the time by at least 10 years to implement service; minimize wetlands impacts; and reduce the overall project costs by starting construction sooner. Phase 1 is projected to result in approximately 1,600 new daily inbound boardings at new stations along the route.

The 2019-2023 CIP includes increased FY 19 funding for design and early action items for Phase 1 construction and service via the Middleborough route. A finance plan for Phase 1 of the South Coast Rail project program is under development.



Registry of Motor Vehicles

ATLAS

- ▶ The ATLAS Program is the realigned 3-year project to move the RMV from a Product Delivery Model to a Service Delivery Model that is customer-centric. The Service Delivery Model aligns business processes, technical solutions, and organizational culture to focus the operation of the RMV on both Retail (Individual) and Business (Commercial) customers.
- ▶ The RMV is **transforming its business processes** and replacing its mainframe system with a Commercial-off-the Shelf (COTS) platform to deliver exceptional customer service for residents and businesses across the Commonwealth. This system features driver and vehicles services, customer correspondence, revenue management, business partner interfaces, and performance management data and reporting.
- ▶ ATLAS provides:
 - Customers with an easier, faster, and more convenient customer experience
 - RMV professionals with the most efficient and effective tools, processes, and policies and empowers them to **deliver outstanding service across every service channel, every transaction, every time**
 - Business partners with **new, modern, and more convenient ways to access and share data** with the RMV so they can conduct business quickly and reliably.

Aeronautics

- ▶ **Reconstruct Runway 15-33 and Realign Taxiways at Barnstable Municipal Airport** - This project includes the reconstruction of Runway 15-33, the realignment of a portion of Taxiway B, Taxiway C, and the replacement of an emergency back-up generator in the airfield lighting vault.
 - ▶ This investment will correct deficiencies in airfield geometry, extend the useful service life of the airfield pavements, and replace inefficient and outdated electrical equipment.

- ▶ **Remove and Replace Pavement Markings (Airport-Wide) at New Bedford Regional Airport** – The Airport recently obtained an FAA Part 139 commercial service certificate. The certificate is contingent upon the Airport repainting certain markings on the airfield to aid pilots.
 - ▶ This investment will help to maintain an orderly flow of aircraft during taxiing, ground, and flight operations to enhance safety and minimize the risk of aircraft accidents.
 - ▶ By completing this project, the airport will be in full compliance with Part 139 standards and can now accommodate larger private and commercial planes that seat more than nine passengers, which will make new routes commercially viable for the airport and the region.

Glossary of terms

Term	Definition
Americans with Disabilities Act of 1990 (ADA)	The ADA is a federal civil rights law mandating equity of opportunity for individuals with disabilities. The ADA prohibits discrimination in access to jobs, public accommodations, government services, public transportation, and telecommunications. http://www.massdot.state.ma.us/OfficeofCivilRights/ADA.aspx . https://www.ada.gov/ .
Chapter 90	Chapter 90 refers to the Commonwealth's reimbursable municipal grant program that provides funding from general obligation bond issuances to municipalities for roadway projects, such as resurfacing and related work, right-of-way acquisition, landscaping and tree planting, and building sidewalks among other qualifying roadway projects. http://www.massdot.state.ma.us/highway/DoingBusinessWithUs/LocalAidPrograms/Chapter90Program.aspx
Environmental Justice (EJ)	Established under Federal Executive Order 12898 and reflected in MA state policy, Environmental Justice requires federal funding recipients to identify and address disproportionately high and adverse human health or environmental effects of programs, policies, and activities on minority populations and low-income populations. https://www.mass.gov/environmental-justice-policy and https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf
Executive Office for Administration and Finance (ANF)	ANF is the budget office for the Commonwealth that administers state transportation capital funding in the form of bonds. https://www.mass.gov/topics/executive-office-for-administration-and-finance
Federal Transportation Partners	MassDOT's federal transportation partners on the CIP include the Federal Highway Administration (FHWA) https://www.fhwa.dot.gov/ , Federal Transit Administration (FTA) https://www.transit.dot.gov/ , Federal Railroad Administration (FRA) https://www.fra.dot.gov/ , and Federal Aviation Administration (FAA) https://www.faa.gov/ .
Focus40	Focus40 is the MBTA's 25-year investment plan. Focus40 is currently under development and aims to create a long-term investment strategy that will inform future CIPs. www.mbtafocus40.com .
Fiscal Year (FY)	Fiscal year refers to a specific budgetary year. The United States federal fiscal year (FFY) begins on October 1 of the previous calendar year and ends on September 30. For example, the 2019 FFY is October 1, 2018 to September 30, 2019. The Massachusetts state fiscal year (SFY) begins on July 1 of the previous calendar year and ends on June 30. The 2019 State FY is July 1, 2018 to June 30, 2019. MassDOT also operates on the calendar year for some projects and programs.

Term	Definition
Fixing America's Surface Transportation Act (FAST Act)	The FAST Act (Pub. L. No. 114-94) was signed into federal law on December 4, 2015. The FAST Act authorizes \$305 billion over fiscal years 2016 through 2020 for highway improvements, motor vehicle safety, public transportation, motor carrier safety, hazardous materials safety, rail improvement, and research, technology, and statistics programs. https://www.fhwa.dot.gov/fastact/ .
Massachusetts Bay Transportation Authority (MBTA)	The MBTA provides public transit services to the Greater Boston region, including bus transit, commuter rail, and rapid transit. The agency is overseen by a five-member Fiscal and Management Control Board (FMCB). https://mbta.com/leadership/fmcb .
Massachusetts Department of Transportation (MassDOT)	MassDOT is made up of four divisions: Highway, Rail & Transit, Registry of Motor Vehicles (RMV), and Aeronautics, as well as enterprise services that support the divisions. The agency has a Board of Directors, comprised of eleven members who are all appointed by the Governor with one designated as Chair. The MassDOT Board serves as the governing authority for the Massachusetts Department of Transportation. https://www.mass.gov/orgs/massdot-board-of-directors .
Metropolitan Planning Organization (MPO)	An MPO is a regional transportation, policy-making organization consisting of representatives from local government, regional transit operators, and state transportation agencies. Federal legislation passed in the early 1970s requires the formation of an MPO for any urbanized area with a population greater than 50,000. The Commonwealth of Massachusetts has 10 urbanized regions designated as MPOs and 3 rural regions that function like MPOs. Each of the MPOs has co-terminus boundaries with state-created Regional Planning Agencies (RPAs). http://www.massdot.state.ma.us/planning/Main/PlanningProcess/RegionalPlanning.aspx
Moving Ahead for Progress in the 21st Century (MAP-21)	MAP-21 (Pub. L. No. 112-141) was signed into law on July 6, 2012. MAP-21 authorized over \$105 billion for fiscal years (FY) 2013 and 2014 and created a streamlined and performance-based surface transportation program, of which many elements were carried over into the current FAST Act. https://www.fhwa.dot.gov/map21/
Planning for Performance Tool (PfP)	The Planning for Performance tool is a scenario-planning tool, custom built for MassDOT, that forecasts asset conditions and allows capital planners within the Divisions to consider the tradeoffs between investment strategies. The tool reports future conditions compared against the desired performance target.

Term	Definition
Project Selection Advisory Council (PSAC)	The Project Selection Advisory Council was established by the Massachusetts Legislature in Section 11 of Chapter 46 of the Acts of 2013 and was charged with developing recommendations for a more data-driven, transparent, and uniform process for the selection of projects that would be included in MassDOT's capital plans. The evaluation criteria established by PSAC is used to score CIP projects. However, State of Good Repair investments are not currently scored through the evaluation system recommended by PSAC, and are instead prioritized using existing asset management systems where applicable.
Public-Private Partnership (P3)	Public-private partnerships are contractual agreements formed between a public agency and a private sector entity that allow for greater private sector participation in the delivery and financing of transportation projects. https://www.fhwa.dot.gov/ipd/p3/defined/
Regional Planning Agency (RPA)	A Regional Planning Agency serves as a forum for state and local officials to address issues of regional importance, including the development of comprehensive plans and recommendations in areas of population and employment, transportation, economic development, land use, regional growth, and the environment. http://www.apa-ma.org/resources/massachusetts-regional-planning-agencies
Regional Transit Authority (RTA)	Regional Transit Authorities provide fixed route and paratransit service in communities across Massachusetts. There are 15 RTAs in Massachusetts in addition to the MBTA. http://www.mass.gov/eohhs/gov/commissions-and-initiatives/hst/public-transportation-in-massachusetts.html
Regional Transportation Plan (RTP)	The RTP is the policy and vision document of a regional MPO. This document results from regional and statewide collaboration to plan a region's transportation system. The document contains a financial plan or budget which guides and shapes the actions an MPO undertakes as they fulfill the region's visions and objectives. This document includes a 20-year vision for transportation in the region, and is updated every four years by each MPO. It serves as an important source of data for the statewide Capital Investment Plan.
State of Good Repair (SGR)	A level of state of State of Good Repair condition is achieved when an entity is managing an existing asset both functionally, reliably, and safely within its expected life cycle to a predefined level of performance.
State Transportation Improvement Program (STIP)	The State Transportation Improvement Program is a compilation of the thirteen regional Transportation Improvement Programs (TIPs) prepared annually by the state's ten Metropolitan Planning Organizations (MPOs) and three rural Transportation Planning Organizations (TPOs). It is a list of priority transportation projects (roadway and transit) organized by region and fiscal years.

Term	Definition
Title VI	<p>Title VI of the Civil Rights Act of 1964 (Title VI) is a federal civil rights law which prohibits discrimination against members of the public on the basis of race, color, and national origin in programs and activities receiving federal financial assistance. Additional federal nondiscrimination categories are contemplated under Title VI and reached by MassDOT's Title VI Program, including age, sex, disability, and limited English proficiency (LEP).</p> <p>https://www.justice.gov/crt/fcs/TitleVI-Overview https://www.massdot.state.ma.us/OfficeofCivilRights/TitleVI.aspx</p>
Transportation Improvement Program (TIP)	<p>A Transportation Improvement Program is a phased five-year program of capital investments that reflect the needs of the regional transportation system, prepared by each MPO on an annual basis. Under federal regulations, a TIP must be constrained to available funding; be consistent with the relevant long-range Regional Transportation Plan, and include an annual element or list of projects to be advertised in the first year of the TIP. Like the STIP, the regional TIP has a roadway component and a transit component.</p>
Universe of Projects	<p>Universe of projects refers to the full catalog of all project ideas and concepts to be considered for investment.</p> <p>https://www.mass.gov/service-details/capital-investment-plan-cip</p>



Map description

The interactive viewer found in this CIP depicts all projects active in the CIP. Investments in each MassDOT division are symbolized by mode and have been mapped wherever possible. To use the map, click directly on the interface. There are a number of tools available to help navigate in the top left corner of the map area. Users can search a specific location by typing it directly into the address bar, use the plus and minus icons to adjust zoom levels, go back to the map's initial extent (the area depicted by the map) by clicking the house icon, or use the bottom target icon to zoom to their current location.

Once the user has targeted a project they would like to learn more about, they can click directly on the project to see more details, which will be displayed in a pop-up box. Additionally, the small grey bar with an arrow on it at the bottom of the page will open the attribute table. This table enables users to filter and search all the projects on the map. Clicking between the tabs at the top of the table will filter the project list to show only projects of the type noted on the tab. Below the tab ribbon, users will see the following tools:

- Options: reveals a drop-down menu that allows you to modify the table view
- Filter by Map Extent: shows only projects within the visible extent of the map area
- Zoom To: zooms to selected features
- Clear Selection: removes all selections from features
- Refresh: refreshes display to show the current query

If a user would like to select a record from the table manually, they can click the space to the left of the record. When finished with the table, it can be closed by clicking the small grey bar with an arrow on it located at the bottom of the map area.

The final tool sets are nested in the black bar at the top right of the map. From left to right, these tools represent:

- Basemap Gallery: enables users to change background imagery
- Legend: displays all the map symbology visible in the map
- Layer List: allows users to turn off/on certain layers they do or do not wish to see
- Print button: will export an image of the map layout to the file extension that best suits your needs

If you have any additional questions about using the interactive CIP viewer, please visit the following [Youtube](#) link where a MassDOT GIS professional walks through each of the tools and outlines example cases for each.

What is a capital plan update?



Elements include statement of priorities, financial plan, and listing of recommended investments

Five-years: 2019-2023 and updated annually

All agencies: MassDOT Divisions and MBTA

Approved by Boards of Directors

Fits within Commonwealth-wide five-year capital plan



2019-2023 Capital Investment Plan update process

**Refine
scoring
criteria
and
programs**

**Align CIP
and STIP**

**Estimate
funding
sources**

**Set
program
budgets**

**Choose
projects**

**Draft for
public
review**

**Final CIP
for Board
of
Directors
approval**

**Process
look-back**



SFY 2018 accomplishments

Aeronautics

- ▶ Reconstructed Runway 5-23 and Runway Safety Areas (RSAs) at Lawrence Municipal Airport
 - ▶ Extends the useful life of the pavement and provides safe and unobstructed runway access for crash, fire, and emergency rescue equipment.
- ▶ Installed security cameras at (5) public use airports to halt aircraft break-ins, and provide clear runway & gate visibility.
- ▶ Began the build-out (second floor addition) of the snow removal equipment building at Norwood Airport (\$1.5 million)
 - ▶ Eliminates need for a new airport administration building (cost savings of \$2.5 million)

Information Technology

- ▶ Developed new field inspection report application for Highway field engineers which standardizes the procedure to record and approve daily inspection reports across all highway projects.
 - ▶ Application supports construction progress reporting in an unbiased format and provides links to the payment system to record pay slips and work performed.
- ▶ Implemented an automated, electronic application for the federal aid programming office (FAPRO)
 - ▶ Eliminated a number of complex manual processes that supported MassDOT capital planning and the federal reimbursement process.

Highway

- ▶ All electronic tolling (AET) successfully implemented November 2016; as of February 2017:
 - ▶ 156.8 million transactions processed
 - ▶ 86% of transactions processed with an E-Z Pass
 - ▶ Average of 12 minutes saved on eastbound trips along I-90 from I-495 to South Boston
- ▶ 92% of construction contracts completed on or under budget in FY17
- ▶ 2.2% of interstate pavement in poor condition in FY17, meeting current target of less than 5%
- ▶ 97% of the construction program spending on statewide reliability/maintenance and modernization investments was delivered

MBTA

Major milestones:

- ▶ Green Line Extension \$1 billion Design-Build contract awarded in November 2017 with notice to proceed in December 2017; first Green Line pilot cars arrived March 2018
- ▶ First new Orange Line pilot cars arrived for testing in December 2017; construction began on Orange Line infrastructure improvements
- ▶ Positive Train Control hardware and software installation continues in advance of December 2018 deadline
- ▶ AFC 2.0 implementation reached commercial and financial close in March 2018
- ▶ State of good repair construction contract awards projected to exceed \$450M in FY18; three times the amount awarded in FY16 and 37 percent higher than FY17

Rail

- ▶ Received approval for draft supplemental environmental impact report (DSEIR) for South Coast Rail project
 - ▶ MEPA certificate issued March 30, 2018
- ▶ Made asset improvements with the following investments:
 - ▶ Purchased and distributed 33,000 tons of ballast stone,
 - ▶ Installed 77,000 crossties and 1,100 switch timbers
 - ▶ Inspected 200 bridges and culverts
 - ▶ Made major repairs to 17 bridges
 - ▶ Replaced one bridge
 - ▶ Replaced three existing culverts
 - ▶ Reconstructed and upgraded 19 grade crossings and made signal upgrades to 8 crossings
 - ▶ Surfaced, lined, and tamped 210,000 feet of rail track (approximately 35 miles)
 - ▶ Reconstructed track and paving at Wharf Yard in Fall River
 - ▶ Reconstructed track, paving, and electric power for Cape Flyer trainset at Hyannis Yard
 - ▶ Replaced Lewis Wye switch in Walpole
 - ▶ 41,000 trucks have been removed from the road with completion of nine IRAP projects

Registry of Motor Vehicles

- ▶ ATLAS
 - ▶ Release 1 went live on March 26, 2018
 - ▶ Registry began offering federally compliant REAL ID credentials
- ▶ Opened 3 new Service Centers in Brockton, Plymouth, and Leominster to provide enhanced customer experience
- ▶ Added 10 more AAA locations so that all AAA locations in the state are offering Registry services, 34 in total.

Transit

- ▶ Funded a total of 181 replacement vehicles for Regional Transit Authorities
 - ▶ 45 RTA >30 ft. buses replaced
 - ▶ 135 RTA <30 ft. buses replaced
- ▶ Funded the LRTA's Gallaher Intermodal Center (Terminal Improvement) project in Lowell
 - ▶ Includes additional 1000 SF of interior space, improved customer amenities and ticketing technology
- ▶ Provided construction funding (\$39 million) for Year 2 of 3 for PVTA's Cottage Street operations & maintenance facility

Plan update: approach

Capital Planning Approach

- This is a one-year update
- The majority of the CIP was set in motion in SFY 2018-2022
- Adding SFY 2023
- Over one-third of the CIP is dedicated to projects with our municipal partners

Priorities: this CIP update maintains the strategy to invest first in the reliability of the transportation system, followed by modernization and, as final priority, expansion. For the 2019-2023 CIP emphasis has shifted to modernization of our assets with our programmed investments. Reliability and Modernization combined account for over 78% of our investments.

Programs: this CIP update has changed some programs to better reflect the needs of modal divisions or asset management. There are 67 investment programs. See details on the program changes. With this CIP, major multi-faceted projects such as Green Line Extension, South Coast Rail, among others, have now been shifted into their own programs.

Project selection: this CIP update reflects the changes made in 2018 to the weights used in the evaluation of modernization and expansion investments.

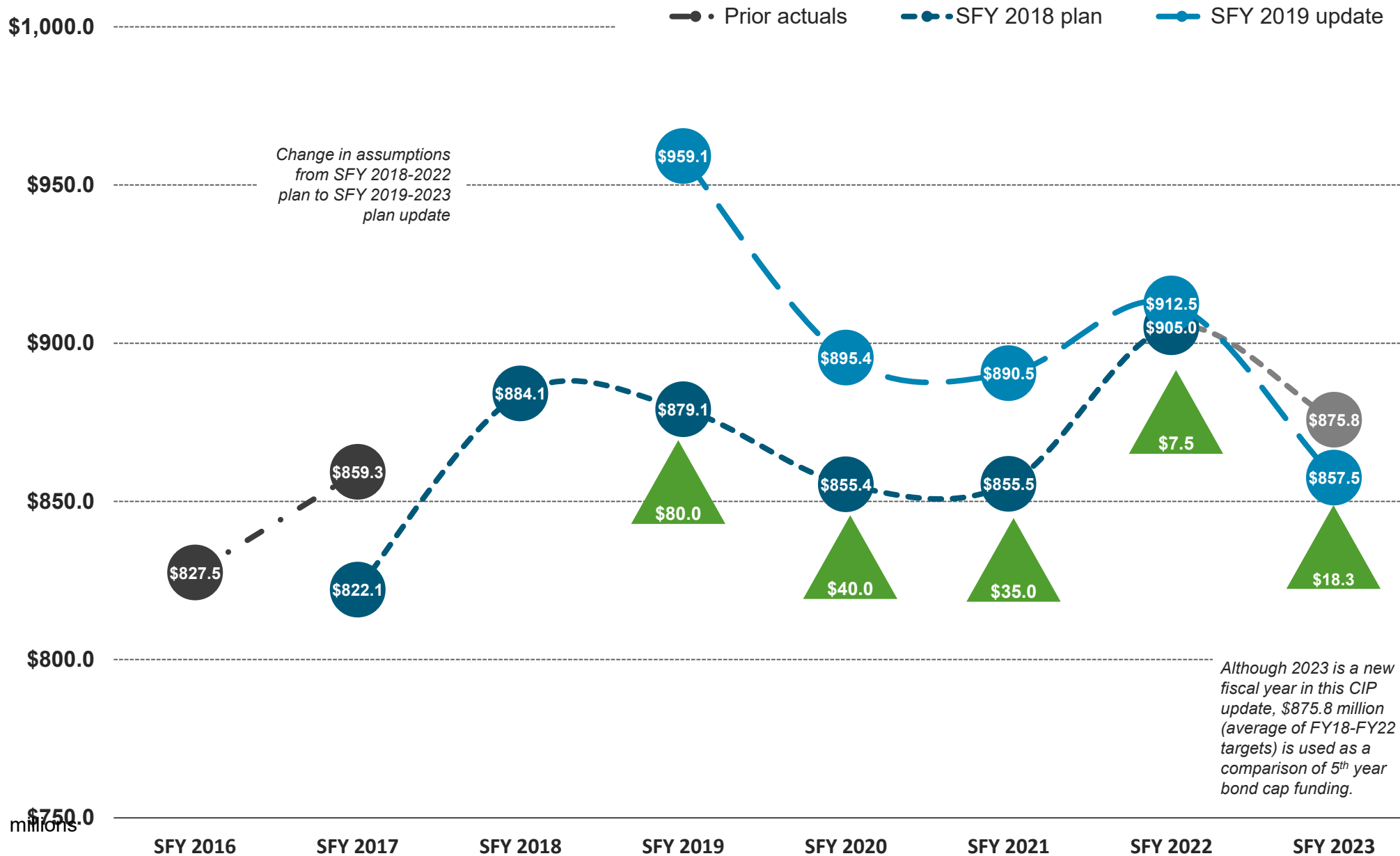
Planning for Performance Tool: the tool was revamped to more clearly reflect the CIP programs contained in this CIP update. The tool also updated data and analysis for some programs. The tool will continue to be updated in the future to forecast the performance of as many programs as possible.

Project intake: a new tool was launched in 2017 to help our municipal partners initiate Highway Division projects to be considered for investment by MassDOT or their respective MPO. This tool streamlines and improves what used to be a paper-driven process, which required substantial manual entry of data. The tool will continue to be improved and will be expanded to other Divisions including the MBTA.

CIP and STIP alignment: the development timelines of the CIP and STIP were aligned so that all applicable investments are identified in each document. This is important for the CIP to more accurately reflect regional priority projects identified by our MPO partners.

Plan update: bond cap comparisons

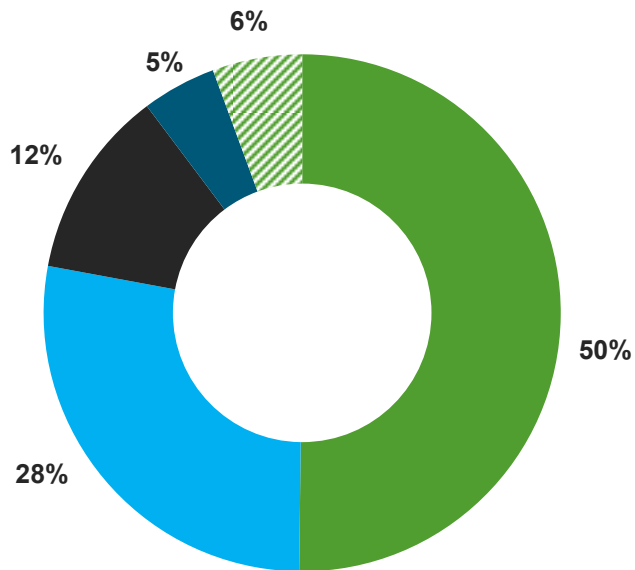
Bond cap: SFY 2018-2022 plan versus SFY 2019-2023 plan update



Program investments by Division

Aeronautics	Highway	IT	MBTA	Rail	RMV	Transit	OTP	Total SFY19 23
\$269.3 (millions)	\$4,411.6	\$59.5	\$3,775.4	\$252.4	\$1.1	\$169.9	\$4.6	\$8,943.7
Aeronautics	Highway	IT	MBTA	Rail	RMV	Transit	OTP	Total SFY19 23
\$25.0 (millions)	\$1,768.8	\$43.7	\$2,934.3	\$59.4	\$67.5	\$42.7	\$0	\$4,941.4
		Highway	MBTA	Rail	OTP	Total SFY19 23		
		\$488.7 (millions)	\$1,422.5	\$139.0	\$60.0	\$2,110.2		

Overall program budget breakdown



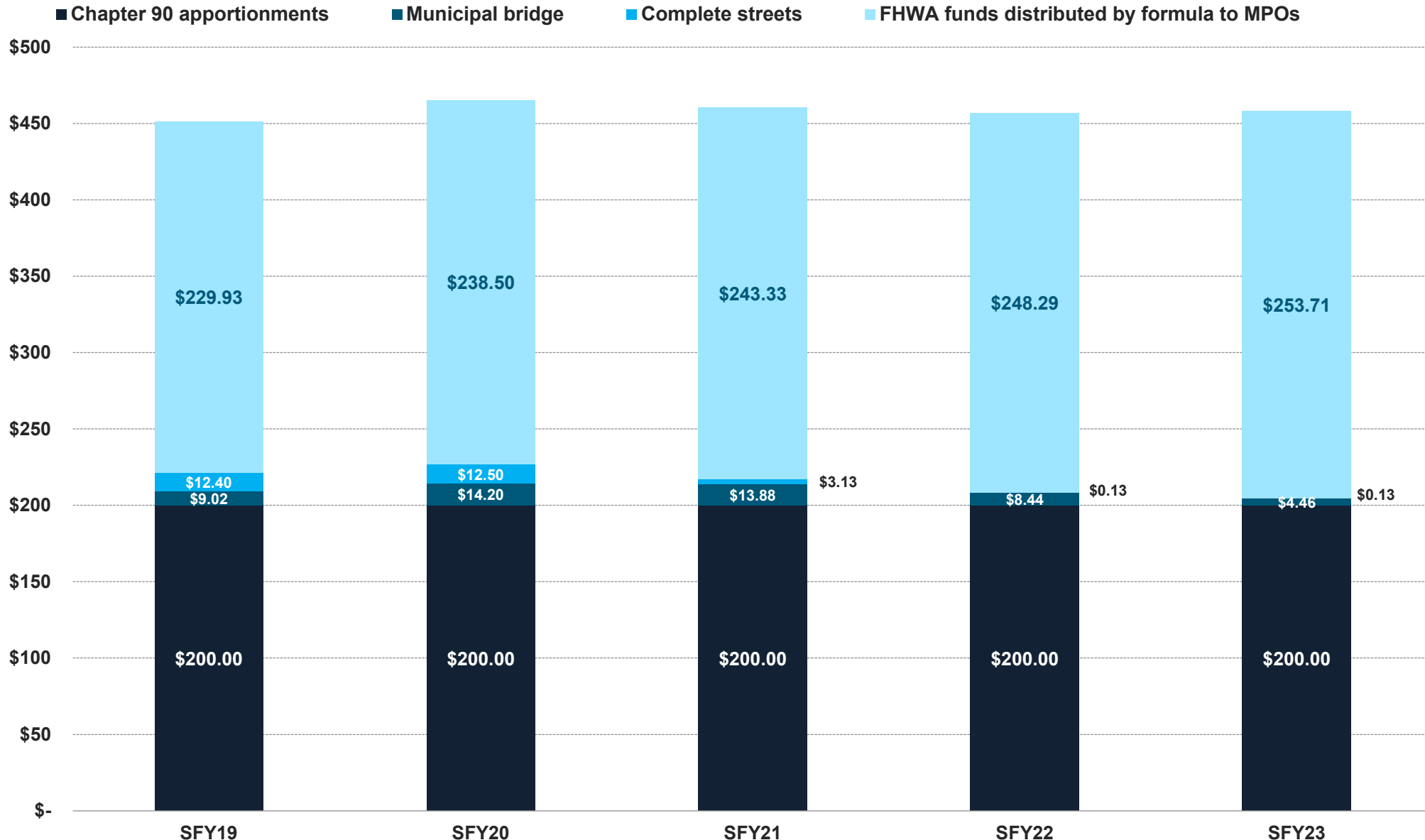
<i>millions</i>	SFY 2018- 22	SFY 2019- 23	Differences
Reliability	\$9,790.2	\$8,943.7	-\$846.5
Modernization	\$3,280.5	\$4,941.4	+\$1,660.9
Expansion	\$2,213.4	\$2,110.2	-\$103.2
Chapter 90	\$1,000.0	\$1,000.0	-
Planning, Enterprises Services, & Other	\$910.4	\$827.8	-\$82.7
Five-year total	\$17,194.6	\$17,823.1	\$628.5

Funding for municipalities

Five-year total =
\$2.3 billion

- Over one-third of Highway Division state and federal funds in this plan update go to support investments in municipal roadways and bridges

Annual funding available for municipal roadway investments (in millions)



Plan update: program changes

Program changes

Highway Division / Design, Row, Environmental: program costs were allocated to individual CIP programs that these efforts support. Previously these investments were not represented within the individual program structure.

Highway Division / Retainage and Utility Payments: program costs were allocated to individual CIP programs that these efforts support. Previously these investments were not represented within the individual program structure.

Highway Division / Bicycle/Pedestrian: costs associated with implementation of the Bicycle and Pedestrian modal implementation plans have been separated into a new program. This program reflects Bicycle and Pedestrian/multi-use path programs substantially funded with FHWA funds.

Highway / Allston Multi-Modal: this program reconstructs and realigns the Allston interchange to improve safety for all transportation modes: walking, cycling, driving, transit and to create a vibrant Allston neighborhood reconnecting sections to each other and to the Charles River. Finance plan is under development.

MBTA / Risk Management and Mitigation: this program's name was modified to include investments related to OSHA and proactive security improvements. Program was formerly called Federal Programs and Mandates.

MBTA / Customer Experience and Technology: program supports investments in projects that modernize the system and enhance customers' experience. Costs associated with this program were formerly included in System Improvements.

Program changes continued

MBTA / Process Improvements and Innovation: program supports investments that develop and implement projects that increase the efficiency and quality of the system through technology and other innovations. Program costs were formerly associated with System Improvements.

MBTA / AFC 2.0: program is the MBTA's new integrated, reliable, and convenient fare payment and collection system to enable customers to pay fares by tapping contactless bank cards, mobile phones, and fare cards across the entire system. Costs associated with this program were formerly included in System Improvements.

MBTA / Red Line/Orange Line Improvements: program supports investments in vehicle and infrastructure needed to fully modernize the Red and Orange line fleets and achieve the service goal of three minute headways. Investments in Red Line/Orange Line improvements were included in 2018-2022 as part of other programs (Revenue Vehicles, Track Signals and Power among others)

MBTA / Commuter Rail Safety and Resiliency: program supports investments that improve the safety and resiliency of the commuter rail network, including the implementation of Positive Train Control (PTC).

MBTA / Green Line Extension: program includes the vehicles, stations and infrastructure to extend the Green Line from a relocated Lechmere Station in East Cambridge to Union Square in Somerville and College Avenue in Medford. Costs associated with this program were formerly included in the Expansion Projects program category

MBTA / Expansion Projects: this program makes targeted expansions in order to improve access to transit, including the Silver Line to Chelsea and Blue Hill Avenue Station on the Fairmount Line.

Program changes continued

OTP / Bicycle and Pedestrian Modal Implementation: program supports investments to meet needs identified through the statewide bicycle and pedestrian planning efforts. The plans address critical needs around safety, accessibility, network connectivity and maintenance.

RMV / ATLAS: program improves RMV service delivery options by replacing the ALARS system. Program dedicated to one project and reduced program size reflects progress on the implementation of the new system. The anticipated completion is expected for 2021.

Rail / South Coast Rail: program reflects the Commonwealth's commitment to move forward with the South Coast Rail project to more fully meet the existing and future demand for public transportation between Fall River/New Bedford and Boston, and to enhance regional mobility while supporting smart growth planning and development strategies in the affected communities. Finance plan for Phase 1 construction is under development.



Plan update: program budget changes

Program budget changes

Program	2018-2022 program budget (in millions)	2019-2023 program budget	Comments
Highway / Design, ROW, Environmental	\$660.0	\$0.0	Program costs allocated to appropriate individual CIP programs support by efforts
Highway / Retainage and Utility Payments	\$50.0	\$0.0	Program costs allocated to appropriate individual CIP programs
Highway / Facilities	\$161.5	\$181.7	Program includes allocation of \$20.2 million in design/project management cost allocation
Highway / Intersection improvements	\$160.7	\$180.8	Program includes allocation of \$20.1 million in design/project management cost allocation
Highway / Interstate pavement	\$281.7	\$316.9	Program includes allocation of \$35.2 million in design/project management cost allocation
Highway / Non-interstate pavement	\$543.9	\$611.9	Program includes allocation of \$68.0 million in design/project management cost allocation
Highway / Roadway Improvements	\$150.0	\$168.8	Program includes allocation of \$18.8 million in design/project management cost allocation
Highway / Safety Improvements	\$235.8	\$265.3	Program includes allocation of \$29.5 million in design/project management cost allocation
Highway / Tunnels	\$350.0	\$393.8	Program includes allocation of \$43.8 million in design/project management cost allocation
Highway / Roadway Reconstruction	\$1,261.0	\$1,418.6	Program includes allocation of \$157.6 million in design/project management cost allocation
Highway / Capacity	\$273.9	\$308.1	Program includes allocation of \$34.2 million in design/project management cost allocation
Highway / Allston Multi-Modal Implementation	\$0	\$16.0	Program reflects investment in roadways, multi-modal bus and rail station, rail layover yard, and pedestrian / open space

The highlighted program budget updates do not reflect all budget updates, rather changes that are most noteworthy

Program budget updates continued

Program	2018-2022 program budget (in millions)	2019-2023 program budget	Comments
Highway / Bicycle and Pedestrian	\$220.5	\$180.6	Program includes allocation of \$20.0 million in design/project management costs and reflects transfer of \$60 million to new program
IT / Cyber and Information Security	\$9.6	\$15.0	Program increased to include compliance with Article 87 – Executive Office of Technology Services and Security (EOTSS) initiatives
MBTA / Accessibility	\$224.2	\$265.0	Program reflects increase in additional Plan for Accessible Transit Infrastructure Investments (PATI) investment
MBTA / Facilities	\$112.6	\$355.0	Program reflects increase in additional spending on bus maintenance facilities & Integrated Fleet and Facilities Plan (IFFP)
MBTA / Risk Management & Mitigation	\$538.8	\$117.1	Renamed program; program reflects investments in OSHA and security upgrades
MBTA/ Revenue Vehicles	\$1,702.7	\$1,289.9	Program reflects decrease since Red Line/Orange Line vehicles are now in their own program
MBTA / Track, Signals, and Power	\$1,285.6	\$950.0	Program reflects scope for RL/OL work now in separate program
MBTA / AFC 2.0	\$622.3	\$160.0	Initiatives combined in 2018-2022 under System Improvements program; split into three different programs for 2019-2023
MBTA / Process Improvements and Innovation		\$25.0	
MBTA / Customer Experience & Technology		\$104.0	

The highlighted program budget updates do not reflect all budget updates, rather changes that are most noteworthy

Program budget updates continued

Program	2018-2022 program budget (in millions)	2019-2023 program budget	Comments
MBTA / Red Line/Orange Line Infrastructure	\$0	\$1,565.7	Program includes vehicle procurements, signal work and infrastructure investments
MBTA / Commuter Rail Safety and Resiliency	\$0	\$637.5	Program reflects various safety and resiliency efforts underway on commuter rail network, including PTC
MBTA / Expansion	\$1,587	\$59.0	Program reflects remaining spending on existing non-GLX expansion projects (no new investments); 2018-2022 program included GLX investment which is now in its own program
MBTA / Green Line Extension		\$1,364.5	Program reflects GLX project cash flows which were included under expansion projects program in 2018-2022 plan
Transit / RTA Vehicle Replacement	\$58.0	\$92.3	Program reflects additional investment to address fleet asset condition
Rail / South Coast Rail	\$0.0	\$108.0	Program reflects funding for South Coast Rail project early construction activities (SFY 2019); was included under Track and ROW expansion in 2018-2022 plan. Finance plan is under development.
Rail / Track and ROW expansion	\$100.0	\$0.0	Program previously included funding for South Coast Rail project; no funds programmed in 2019-2023 for other track and ROW expansion projects.
RMV / ATLAS	\$102.1	\$61.5	Reflects remaining spending on ATLAS implementation

The highlighted program budget updates do not reflect all budget updates, rather changes that are most noteworthy

Plan update: highlighted projects

Wollaston viaduct**
Middleboro
Rte. 1A* in design
and/or permitting

Major projects in
2019-2023 CIP
progressing

Complete Streets &
Muni Bridge
programs continue

- ▶ I-90/I-495 interchange
- ▶ Rt. 79 Fall River
- ▶ N. Washington St. Bridge
- ▶ Chelsea Viaduct

MBTA

GLX funding
Fleet plan
requirements

Vehicle procurements
advancing
SGR spending
accelerating

Worcester third rail
study continuing*
Worcester Union
Station study
underway*

Rail

South Coast Rail
advancing**;
additional funding in
SFY 2019

Knowledge Corridor
wrapping up

Springfield Union
station finishing;
additional funding for
accessible platform

RMV

ATLAS nearing
completion

**Some projects listed in this update are in design and/or permitting but do not yet have construction funds identified. These projects need to advance further in design/permitting before finance plans can be drafted and accurate funding amounts programmed.*

*** Finance plan under development*

Funding

The CIP is funded from a mix of federal and state sources, each of which varies with respect to its flexibility in uses for different elements of the transportation system. Some funding sources must be spent on specific policy goals or modes, while others may be applied across the transportation system.

State funding

The primary source of state transportation capital funding comes from bonds issued by the Commonwealth. Debt is issued to investors and paid back with interest over the course of the bond's life, like a personal loan. The two main types of bonds issued for infrastructure spending are special obligation bonds and general obligation bonds, both of which are administered by the Commonwealth's Executive Office for Administration and Finance (ANF).

ANF issues bonds at its discretion, subject to legislative authorization and overall “bond cap” and debt affordability limitations on the ability of the Commonwealth to borrow. Transportation Bond Bills provide authorization to support transportation capital expenditures such as matching funds for federal transportation funding and Chapter 90 municipal aid for local transportation investments.

Federal funding

Massachusetts receives federal funding to improve our transportation system from several U.S. Department of Transportation agencies including the Federal Aviation Administration (FAA), Federal Highway Administration (FHWA), Federal Transit Administration (FTA), and the Federal Railroad Administration (FRA). FAA provides funding to the Commonwealth's regional airports through MassDOT's Aeronautics Division in the form of grants for capital investments. FHWA provides multi-modal funding to MassDOT, which is divided between "regional funding" allocated to Metropolitan Planning Organizations (MPOs) for municipal investments, and statewide funding for MassDOT-owned assets. Some FHWA funds may also be "flexed" to transit and other surface transportation investments. FTA provides funding to MassDOT, the MBTA, and the Commonwealth's regional transit authorities (RTAs) in the form of grants for capital investments. FRA provides funding to MassDOT and the MBTA in the form of grants for capital investments for railroad improvements.

MassDOT spending by source

Projected sources (in millions)	Final FY 19	Final 5 year Total
Federal sources of funds		
Federal Highway (FHWA) reimbursements	\$611.8	\$3,792.1
Federal Transit (FTA) reimbursements**	\$4.6	\$24.1
Federal Aviation (FAA) reimbursements and grant draws	\$37.0	\$209.6
Federal Rail (FRA) reimbursements and grant draws	\$3.5	\$4.6
Subtotal federal sources*	\$657.0	\$4,030.4
Bond cap	\$898.2	\$4,214.0
Accelerated Bridge bonds	\$76.5	\$92.1
Rail enhancement bonds	\$59.8	\$149.2
CARM	\$24.2	\$190.1
Metropolitan Highway system (MHS) pay-go	\$77.7	\$175.3
Western Turnpike (WT) pay-go	\$30.2	\$105.0
Tobin Bridge (Tobin) pay-go	\$40.9	\$232.1
Gaming	\$0.0	\$0.0
Municipal and local funds	\$3.3	\$14.3
Reimbursable and 3 rd parties	\$3.6	\$34.2
Public private partnerships***	\$ -	\$ -
Subtotal of non federal sources*	\$1,214.3	\$5,206.4
Total sources*	\$1,871.3	\$9,236.7

* Totals may not add due to rounding | ** FTA reimbursements for MassDOT projects only; RTA federal funds are not included; | *** MassDOT is exploring Public-Private Partnership options for the 2019-2023 CIP.



MBTA spending by source

Projected sources (in millions)	<u>FY 19</u>	<u>5 year Total</u>
Federal sources of funds		
Federal Highway (FHWA) reimbursements	\$49.0	\$109.9
Federal Transit (FTA) reimbursements and grant draws	\$402.9	\$2,721.0
FTA Full funding grant agreement (GLX FFGA)	\$92.6	\$827.7
Other federal funds	\$4.3	\$5.9
Subtotal federal sources	\$548.8	\$3,664.6
Bond cap	\$0.9	\$1.0
Accelerated Bridge bonds	\$0.4	\$5.0
Rail enhancement bonds	\$185.3	\$1,097.0
MBTA Revenue bonds	\$207.0	\$1,854.5
Positive Train Control (PTC) financing	\$97.9	\$336.7
Metropolitan Highway system (MHS) pay-go	\$0.7	\$1.3
Municipal and local funds (GLX)	\$0.0	\$75.0
Reimbursable and 3 rd parties	\$14.4	\$84.0
Pay-go lockbox (Bond Cap)	\$60.0	\$300.0
Pay-Go lockbox (MBTA)	\$159.6	\$551.2
Capital maintenance fund	\$0.0	\$5.4
Subtotal of non federal sources	\$598.3	\$4,313.9
Total Sources*	\$1,073.4	\$8,133.1

About MassDOT funding sources

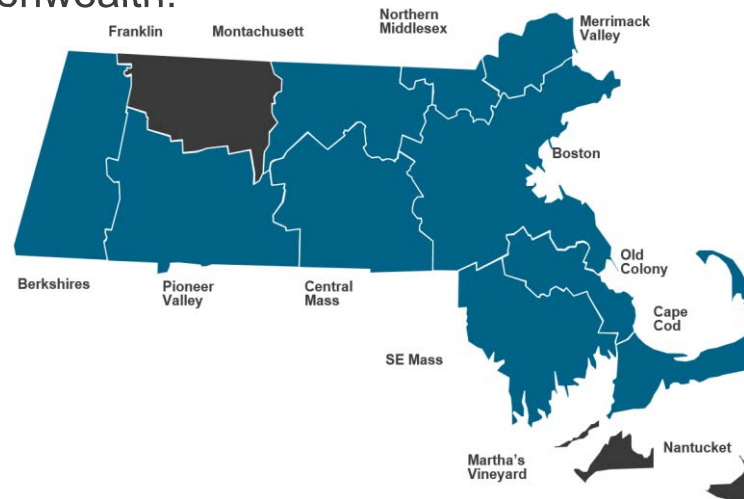
Source	Description
Federal Highway (FHWA) reimbursements	MassDOT obligates available Federal Highway Administration funds every federal fiscal year. This funding category involves MassDOT drawing down obligated amounts to reimburse the Commonwealth for Highway and Rail Division project spending.
Federal Transit (FTA) reimbursements	MassDOT obligates available Federal Transit Administration funds every federal fiscal year. This funding category involves MassDOT drawing down obligated amounts to reimburse the Commonwealth for Rail & Transit Division project spending. The spending by source tables do not include FTA funds available to Regional Transit Authority partners.
Federal Aviation (FAA) reimbursements and grant draws	MassDOT applies for Federal Aviation Administration funds every federal fiscal year. This funding category involves MassDOT drawing down those approved grant amounts to pay for Aeronautics Division project spending.
Federal Rail (FRA) reimbursements and grant draws	MassDOT from time to time applies for Federal Railroad Administration funds. This funding category has MassDOT draw down approved grant amounts to pay for Rail & Transit Division and Office of Transportation Planning project spending.
State bond cap	Commonwealth general obligation bond proceeds allocated to specific projects; primarily for project design, management, operations and other construction support provided to the Aeronautics, Highway and Rail and Transit Divisions and the MBTA (see MBTA sources)
Accelerated Bridge bonds	Commonwealth special obligation bond proceeds allocated to specific bridge projects; primarily for project operations and construction
Rail enhancement bonds	The Commonwealth Rail Enhancement Program; a dedicated \$2.1B program for reliability, modernization and expansion initiatives at the MBTA, including the State's share of the Green Line Extension project.
CARM	Central Artery Remediation Monies (CARM) for eligible MHS projects; subject to FHWA approval
Metropolitan Highway System (MHS) pay-go	Projected annual revenues available for capital for the toll facilities east of I-95 plus any existing projected reserve balances
Western Turnpike (WT) pay-go	Projected annual revenues available for capital for the toll facilities west of I-95 plus any existing projected reserve balances
Tobin Bridge (Tobin) pay-go	Projected annual revenues available for capital for this toll facility plus existing projected reserve balances
Gaming funds	Annual gaming revenues generated by casinos and devoted to the Transportation Infrastructure and Development Fund
Municipal and local funds	Funds provided by municipalities to match federal-aid sources or to pay for construction bid items
Reimbursable and 3rd parties	Third party funding for specific initiatives
Public private partnerships	Project financing mechanism that includes private sector resources. MassDOT is exploring the use of this financing mechanism.

About MBTA funding sources

Source	Description
Federal Highway (FHWA) reimbursements	FHWA funds such as Congestion Mitigation Air Quality (CMAQ) or earmarks “flexed” to FTA for use on the Green Line Extension (GLX) project and other eligible MBTA projects
Federal Transit (FTA) reimbursements and grant draws	Reflects Sec. 5307 Urbanized Area Formula funds, Sec. 5337 State of Good Repair/Fixed Guideway funds, and Sec. 5339 Bus and Bus Facilities Funds. Assumes FAST act levels continue. Federal share only – does not include 20% match from MBTA revenue bonds.
FTA Full Funding Grant Agreement (GLX FFGA)	Amount obligated and projected for the Green Line Extension project through the Full Funding Grant Agreement between FTA and the MBTA
Other federal funds	Non-U.S. DOT federal funds, including Transit Security Grant Program administered by the Department of Homeland Security
State bond cap	Commonwealth general obligation bond proceeds allocated primarily to state of good repair projects.
Accelerated Bridge bonds	Commonwealth special obligation bond proceeds allocated to specific bridge projects; primarily for reimbursement of MBTA related project costs
Rail enhancement bonds	The Commonwealth Rail Enhancement Program; a dedicated \$2.1B program for reliability, modernization and expansion initiatives at the MBTA, including the State’s share of the GLX project and elements of the Red and Orange Line Improvements Program
MBTA Revenue Bonds	Revenue bonds issued by the MBTA, including Sustainability Bonds.
Municipal and local funds (GLX)	Cambridge and Somerville contributions toward the GLX project.
Reimbursable and 3rd parties	Third party funding for specific initiatives, includes reimbursable agreements with Amtrak and RIDOT
Positive Train Control (PTC) financing	Reflects proceeds from revenue bonds issued or to be issued for the PTC project(s). Transportation Infrastructure Finance and Innovation Act (TIFIA) and Railroad Rehabilitation & Improvement Financing (RRIF) financing will be available upon completion of the project.
Pay-Go lockbox (Bond Cap)	Funds that are available due to operating budget savings and state assistance; amounts are allocated to specific reliability and modernization projects
Pay-Go lockbox (MBTA)	Funds that are available due to operating budget savings and state assistance; amounts are allocated to specific reliability and modernization projects
Capital Maintenance Fund	Funds available at the discretion of the CFO for unanticipated and urgent capital maintenance needs

CIP and the STIP

MassDOT annually produces another multi-year capital-planning document called the State Transportation Improvement Program (STIP). While similar, the STIP and CIP are not the same. The STIP is a federally required planning document that lists all federally funded transportation projects, both highway and transit, by region of the Commonwealth and by federal fiscal year. The STIP is subject to approval by the U.S. Department of Transportation and the U.S. Environmental Protection Agency, as well as by the Massachusetts Department of Environmental Protection. The STIP is developed in part by compiling the individual Transportation Improvement Programs (TIPs) from the 13 federally recognized transportation planning regions of the Commonwealth.

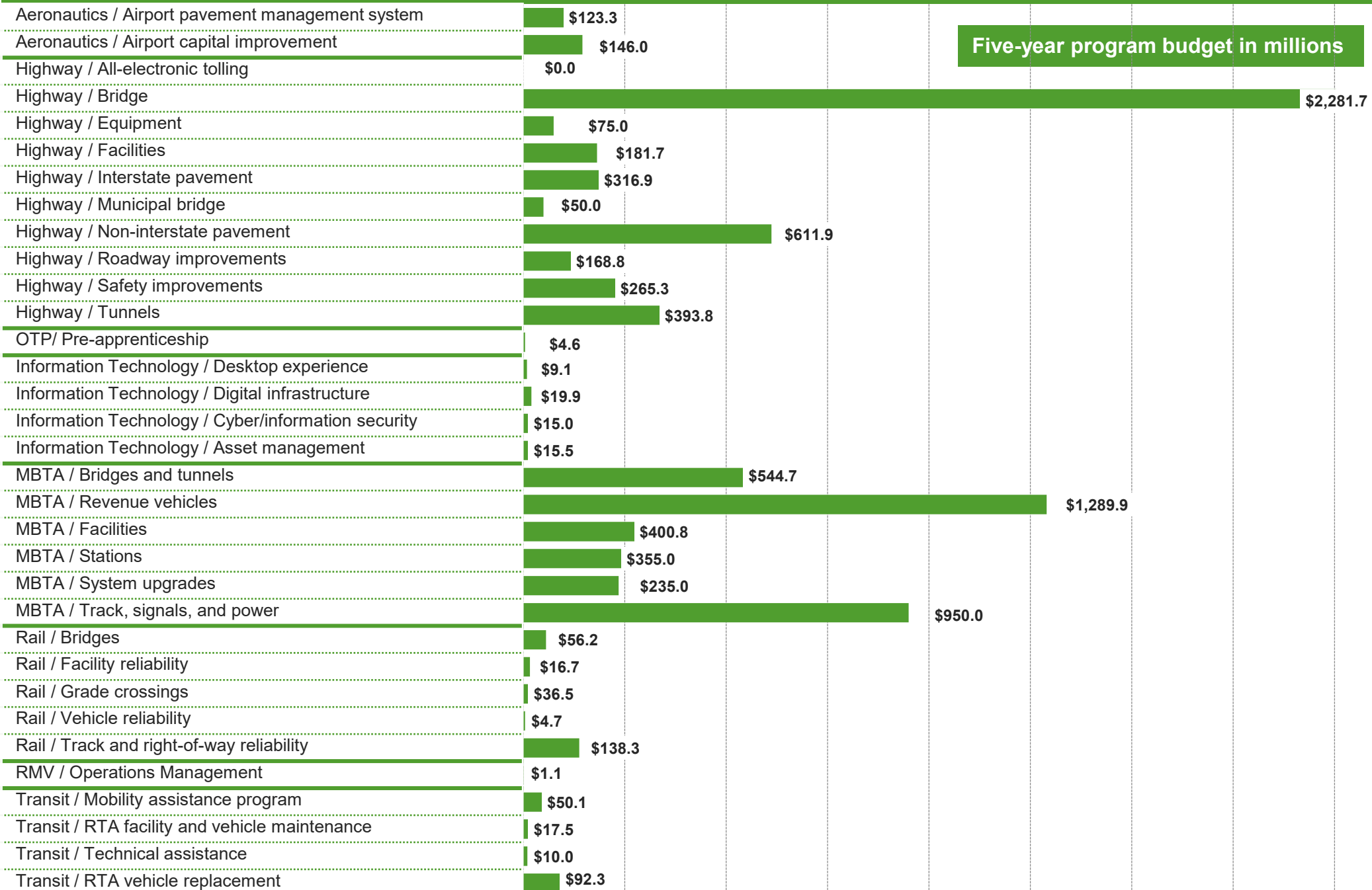


The CIP differs from the STIP in several ways, one of the most important of which is that the CIP identifies all of the sources and uses of transportation funding employed by Massachusetts, while the STIP is primarily dedicated to federal funding and federally funded transportation projects. In addition, the CIP also includes state capital funding for projects advanced by the Rail side of the Rail and Transit Division, the Aeronautics Division, and the Registry of Motor Vehicles, which do not generally receive funding through the STIP (which is compiled almost exclusively of roadway and public transit projects). The CIP is also not subject to federal approval.

The STIP now makes use of the priorities/programs/projects framework around which the MassDOT agencies have built the 2019-2023 CIP. This effort was initiated with the 2018-2022 CIP. You may find the STIP here:

<http://www.massdot.state.ma.us/planning/Main/StatewidePlans/StateTransportationImprovementProgram.aspx>

Reliability investments by program



Aeronautics	Highway	IT	MBTA	Rail	RMV	Transit	Total <small>SFY19 23</small>
\$269.3(millions)	\$4,411.6	\$59.5	\$3,775.4	\$252.4	\$1.1	\$169.9	\$8,943.7



Reliability programs for Aeronautics

Airport Pavement Management System

Program purpose and need statement:

This program maintains the quality of pavement “inside the airport fence” at an adequate level. This program is necessary to continue safety and maintenance programs at public-use airports.

Program performance:

Tracker target*	2018 – 72% average PCI; 2020 – 85% average PCI; Long term – 85% average PCI
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PfP tool forecast	87 average PCI for airport pavement by 2023
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FY2019-2023 program budget:

\$123.3 million over five years

Airport Capital Improvement

Program purpose and need statement:

This program includes a full range of airport state of good repair projects. This program is necessary to continue safe and efficient airport operations and services.

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP tool
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Other indicators	80% of vegetation management work planned is completed each year.
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FY2019-2023 program budget:

\$146.0 million over five years

* Tracker targets published in MassDOT's Annual Performance Report, November 2017

Reliability programs for Highway

All-electronic tolling

Program purpose and need statement:

This program converted the I-90 corridor from the New York border to Boston from a cash, toll booth system to a cashless system. Included in the program is the demolition of the former toll booths and realignment of exits and interchanges on the I-90 corridor.

Program performance:

Tracker target	2018 – 90%; 2020 – 92%; Long term - 95% E-Z Pass payment rate (vs. pay-by-plate)
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PfP tool forecast	Not forecasted in PfP tool
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Other indicators	To be determined
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FY2019-2023 program budget:

\$66.6 million – full implementation achieved; no spending in 2019-2023; program will be closed

Bridge

Program purpose and need statement:

This program maintains, reconstructs and replaces state and municipally owned bridges across the Commonwealth.

Program performance:

Tracker target	2018 - <14%; 2020 - <13%; Long term <10% NHS deck area in structural deficiency
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PfP tool forecast	Under development
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Other indicators	To be determined
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FY2019-2023 program budget:

\$2,281.7 million over five years

Equipment

Program purpose and need statement:

This program makes routine purchases of vehicles, equipment and other capital assets. This program is necessary for the daily operation of the department.

Program performance:

Tracker target Not established in Tracker

PfP tool forecast Not forecasted in PfP tool

Other indicators To be determined

FY2019-2023 program budget:

**\$75.0 million over
five years**

Facilities

Program purpose and need statement:

This program maintains, repairs and replaces buildings, salt sheds, garages, vent buildings, and telecommunications and other systems owned by the Highway Division.

Program performance:

Tracker target Not established in Tracker

PfP tool forecast Not forecasted in PfP

Other indicators To be determined

FY2019-2023 program budget:

**\$181.7 million over
five years**

Interstate Pavement

Program purpose and need statement:

This program resurfaces and performs related work on the interstate system. This program is necessary to improve pavement conditions.

Program performance:

Tracker target

2018 – 98%; 2020 – 88%; Long term - 99% of pavement in good or excellent condition

PfP tool forecast

Under development

Other indicators

To be determined; set in accordance w/ federal performance requirements

FY2019-2023 program budget:

\$316.9 million over five years

Municipal Bridge

Program purpose and need statement:

This program assists municipalities in repairing and replacing town owned bridges with a span length of less than 20 feet.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP

Other indicators

Number of inspections completed

FY2019-2023 program budget:

\$50.0 million over five years

Non-Interstate pavement

Program purpose and need statement:

This program resurfaces and performs related work on non-interstate roads owned by MassDOT. This program is necessary to fulfill system wide maintenance contracts to improve pavement condition and also includes site-specific projects.

Program performance:

Tracker target	2018 – 62%; 2020 – 62%; Long term - 62% of pavement in good or excellent condition
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PfP tool forecast	Under development
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Other indicators	To be determined; set in accordance w/ federal performance requirements
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FY2019-2023 program budget:

\$611.9 million over five years

Roadway improvements

Program purpose and need statement:

This program supports pot hole, fencing, guardrail, and sidewalk maintenance, repairs and other related improvements on non-interstate, state owned roadways. This program also includes federally funded storm water retrofit projects. This program is preventative in nature, and is necessary to maximize the useful life and condition of roadways.

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP tool
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Other indicators	To be determined
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FY2019-2023 program budget:

\$168.8 million over five years

Safety Improvements

Program purpose and need statement:

This program repairs traffic signals, highway lighting systems, impact attenuators, traffic signs and pavement markings. This program is necessary to provide a safe roadway network for Commonwealth residents and visitors.

Program performance:

Tracker target	2018 – 0.63 fatalities; 6 injuries* 2020 - 0.62 fatalities; 6 injuries* Long term – move to zero
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PfP tool forecast	Not forecasted in PfP
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Other indicators	Crash cluster; crash data
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FY2019-2023 program budget:

\$265.3 million over five years

Tunnels

Program purpose and need statement:

This improves lighting, life safety systems and tunnel infrastructure within the tunnel network.

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP
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Other indicators	To be determined
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FY2019-2023 program budget:

\$393.8 million over five years

*Tracker target per 100 million vehicle miles traveled (VMT)

Reliability programs for IT

Desktop Experience

Program purpose and need statement:

This program delivers best in class, highly resilient technologies and services related to desktop and personal computing, conformance and mobile solutions/devices, and network and internet connectivity. This program is necessary to maintain best practices and state of good repair in desktop IT at MassDOT.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP

Other indicators

Monitor level of state of good repair – age of equipment, engineering performance, latest software releases, help desk support requests.

FY2019-2023 program budget:

\$9.1 million over five years

Digital Infrastructure

Program purpose and need statement:

This program does a range of digital infrastructure work, including state of good repair hardware upgrades and support of operations in the Cloud. This program provides a modern, application-independent information architecture. This program is necessary to meet MBTA's and MassDOT's technology goals by sustaining the core computer, storage, telecommunications and network infrastructure.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP

Other indicators

Monitor level of state of good repair – age of equipment, engineering performance, latest software releases, equipment uptime statistics.

FY2019-2023 program budget:

\$19.9 million over five years

Cyber/Information security

Program purpose and need statement:

This program keeps IT infrastructure and software compliant with best practices and digital security standards to protect both agency and customer data and will comply with Article 87 – EOTSS initiatives. This program is necessary to maintain customer confidence when making secure transactions.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP

Other indicators

Security Awareness Training taken by all employees annually. Comprehensive policies and controls in place. 100% PCI compliance.

FY2019-2023 program budget:

\$15.0 million over five years

Asset Management

Program purpose and need statement:

This program delivers tools and processes to document, report on and manage MassDOT assets. These tools provide data on the asset life cycle. This program is necessary to maintain the reliability of Commonwealth assets by supporting a consistent approach to asset review and remediation.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP

Other indicators

All DOT assets recorded and monitored for state of good repair. Minimize incident reports.

FY2019-2023 program budget:

\$15.5 million over five years

Reliability programs for MBTA

Bridges and tunnels

Program purpose and need statement:

This program repairs, reconstructs and replaces MBTA commuter rail and transit bridges and tunnels system-wide.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP

Other indicators

Number of structurally deficient bridges that have a condition rating under 4 points on the Pontis Scale*

FY2019-2023 program budget:

\$544.7 million over five years

*Pontis is a bridge management system licensed by AASHTO (American Association of State Highway and Transportation Officials) to store the condition of bridge structures. Pontis rates bridge condition on a scale of 1 to 9 with 9 being new.

Revenue vehicles

Program purpose and need statement:

This program rehabilitates and replaces the MBTA revenue fleet, which includes commuter rail, heavy rail, light rail, bus and ferry units.

Program performance:

Tracker target

% of units beyond useful life benchmark

PfP tool forecast

Not forecasted in PfP

TAM requirement*

% of revenue vehicles that meet or exceed the useful life benchmark**

FY2019-2023 program budget:

\$1,289.9 million over five years

*Federally Mandated Transit Asset Management (TAM) Requirement

**Useful Life Benchmark (ULB) is defined as the expected lifecycle or the acceptable period of use in service of a capital asset for a particular transit provider's operating environment.

Facilities

Program purpose and need statement:

This program rehabilitates and upgrades maintenance and administrative facilities that support transit operations.

Program performance:

Tracker target	% of facilities with condition rating <3.0 in TERM* scale
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PfP tool forecast	Not forecasted in PfP
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TAM requirement*	% of facilities rated <3.0 on TERM** scale
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FY2019-2023 program budget:

\$355.0 million over five years

*Federally Mandated Transit Asset Management (TAM) Requirement
**FTA TERM (Transit Economic Requirements Model) condition assessment scale of 1-5, in which an asset in need of immediate repair or replacement is scored as one (1), whereas a new asset with no visible defects is scored as five (5)

Stations

Program purpose and need statement:

This program rehabilitates and upgrades MBTA stations (e.g., commuter rail, commuter boat, subway and bus stations).

Program performance:

Tracker target	% of facilities with condition rating <3.0 in TERM* scale
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PfP tool forecast	Not forecasted in PfP tool
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TAM requirement*	% of facilities rated <3.0 on TERM** scale
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FY2019-2023 program budget:

\$400.8 million over five years

*Federally Mandated Transit Asset Management (TAM) Requirement
**FTA TERM (Transit Economic Requirements Model) condition assessment scale of 1-5, in which an asset in need of immediate repair or replacement is scored as one (1), whereas a new asset with no visible defects is scored as five (5)

System upgrades

Program purpose and need statement:

This program upgrades a wide range of MBTA systems including communications, security, computer technology, fare collection, asset management and environmental remediation systems. It also rehabilitates non-revenue vehicles and equipment.

Program performance:

Tracker target

Non-revenue vehicles: % of vehicles beyond Useful Life Benchmark

PfP tool forecast

Not forecasted in PfP tool

TAM requirement*

% of non-revenue service vehicles exceeding Useful Life Benchmark

FY2019-2023 program budget:

\$235.0 million over five years

* Federally Mandated Transit Asset Management (TAM) Requirement

Track, signals, and power

Program purpose and need statement:

This program rehabilitates, replaces and upgrades track, signal and power assets across the commuter rail and transit system.

Program performance:

Tracker target

% of track segments with performance restrictions

PfP tool forecast

Not forecasted in PfP tool

TAM requirement*

% of track segments with performance restrictions

FY2019-2023 program budget:

\$950.0 million over five years

* Federally Mandated Transit Asset Management (TAM) Requirement

Reliability programs for OTP/ODCR*

Pre-Apprenticeship

Program purpose and need statement:

This program, for which MassDOT is partnering with a number of stakeholders, facilitates the introduction of additional pre-apprentices to skilled trades within our construction program. This program is necessary to provide low-income and other disadvantaged communities with access to training and employment opportunities within the construction trades. Program managed by MassDOT's Office of Diversity and Civil Rights Diversity (ODCR).

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP

Other indicators

To be determined

FY2019-2023 program budget:

**\$4.6 million over
five years**

*ODCR is under Planning (OTP) & Enterprise Services

Reliability programs for Rail

Bridges

Program purpose and need statement:

This program repairs or replaces bridges to avoid deterioration, keep or restore class of line, or maintain utility. Prioritization of projects within this program reflect most recent inspections, type of usage (ex: hazardous cargo), and any contractual or regulatory requirements for action.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP

Other indicators

To be determined

FY2019-2023 program budget:

**\$56.2 million over
five years**

Facility reliability

Program purpose and need statement:

This program repairs or replaces rail facilities, specifically rail yards and stations, to avoid deterioration or maintain the facility's utility. Prioritization of program projects will reflect condition reports, type of risk/usage, and any contractual or regulatory requirements for action. This program is necessary to maintain a safe and reliable rail system.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP tool

Other indicators

To be determined

FY2019-2023 program budget:

**\$16.7 million over
five years**



Grade crossings

Program purpose and need statement:

This program repairs or replaces grade crossings to avoid deterioration, keep or restore class of line, or maintain the crossing's utility. Prioritization of projects in this program will reflect federal guidelines, most recent inspections, type of usage (ex: hazardous cargo), and any contractual or regulatory requirements for action. This program is necessary to maintain a safe and reliable rail system.

Program performance:

Tracker target	1.79 highway-rail incidents/1000 grade crossings
-----------------------	--

PfP tool forecast	54% of grade crossings in desired state
--------------------------	---

Other indicators	Approximately 20 grade crossings per year can be improved at this funding
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FY2019-2023 program budget:

\$36.5 million over five years

Vehicle reliability

Program purpose and need statement:

This program repairs, replaces, or acquires rail equipment (locomotives, coaches, ballast cars, light duty vehicles, etc.) to facilitate reliable service, avoid deterioration, or support activities to maintain or restore class of line. This program is necessary to maintain the rail system in good condition.

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP tool
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Other indicators	To be determined
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FY2019-2023 program budget:

\$4.7 million over five years

Track and right-of-way reliability

Program purpose and need statement:

This program repairs or replaces assets within the rail right of way (typically ties, rail, ballast, culverts, switches, etc.) to avoid deterioration, keep or restore class of line, or maintain the line's utility. Prioritization will reflect most recent inspections, type of usage (ex: hazardous cargo), and any contractual or regulatory requirements for action. This program is necessary to maintain a safe and reliable rail system.

Program performance:

Tracker target	26,000 ties repaired per year
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PfP tool forecast	26,000 ties repaired per year
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Other indicators	To be determined
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FY2019-2023 program budget:

\$138.3 million over five years

Reliability programs for RMV

Operations Management

Program purpose and need statement:

This program maintains and improves existing operating systems to support service delivery, application platforms, and electronic records retention systems.

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP
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Other indicators	To be determined
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FY2019-2023 program budget:

**\$1.1 million over
five years**

Reliability programs for Transit

Mobility Assistance Program

Program purpose and need statement:

This program purchases vans and related equipment used to provide transportation for the disabled and elderly by Councils on Aging, the RTAs and non-profits.

Program performance:

Tracker target Not established in Tracker

PfP tool forecast Not forecasted in PfP

Other indicators Number of organizations who attended a training to participate in M.A.P.

FY2019-2023 program budget:

\$50.1 million over five years

RTA facility and vehicle maintenance

Program purpose and need statement:

The program addresses the maintenance, rehabilitation and upkeep of existing RTA facilities or vehicles.

Program performance:

Tracker target Not established in Tracker - facility condition (range)

PfP tool forecast Not forecasted in PfP tool

Other indicators To be determined

FY2019-2023 program budget:

\$17.5 million over five years



Technical assistance

Program purpose and need statement:

This program is used to provide technical assistance to support the transit program (grants management systems, vehicle inspections, etc).

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP
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Other indicators	To be determined
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FY2019-2023 program budget:

\$10.0 million over five years

RTA vehicle replacement

Program purpose and need statement:

This program replaces existing Regional Transit Authorities' (RTA) vehicles so that they meet state of good repair standards.

Program performance:

Tracker target	Not established - demand response vehicle age / revenue vehicle condition
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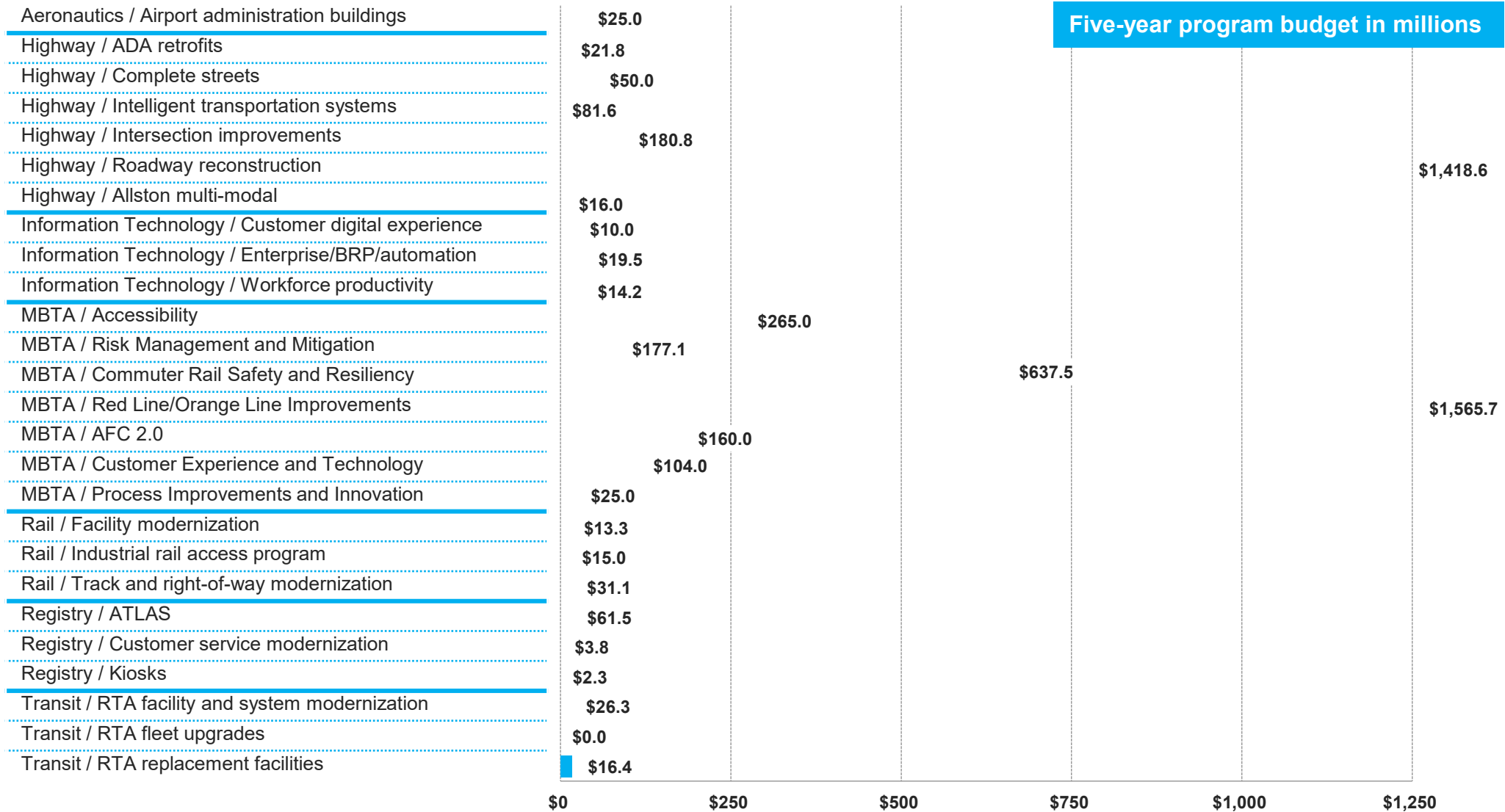
PfP tool forecast	7.4 average fleet age in years (up from 4.9)
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Other indicators	To be determined
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FY2019-2023 program budget:

\$92.3 million over five years

Modernization investments by program



Aeronautics	Highway	IT	MBTA	Rail	RMV	Transit	Total <i>SFY19 23</i>
\$25.0 (millions)	\$1,768.8	\$43.7	\$2,934.3	\$59.4	\$67.5	\$42.7	\$4,941.4



Modernization program for Aeronautics

Airport Administration Buildings

Program purpose and need statement:

This program builds or renovates airport administration buildings as recommended by the 2010 Statewide Airport System Plan, which identified 17 airports that did not have existing, or adequate administration buildings. This program is necessary to provide sufficient administrative spaces in airports, which is integral to improving the safety, efficiency, and business growth of the airport asset.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP

Other indicators

Goal is to address one building per year with this funding level

FY2018-2022 program budget:

**\$25.0 million over
five years**



Modernization programs for Highway

ADA Retrofits

Program purpose and need statement:

This program improves the condition and accessibility of state owned sidewalks. This program is necessary to meet obligations identified under the MassDOT ADA Transition Plan.

Program performance:

Tracker target

2018 – 40% reduction from FY 12
2020 – 60% reduction from FY 12
Long term - 0 failed or missing

PfP tool forecast

Under development

Other indicators

Number of failed or missing curb ramps on statewide inventory

FY2019-2023 program budget:

**\$21.8 million over
five years**

Complete Streets

Program purpose and need statement:

This program rewards communities that demonstrate a commitment to embedding Complete Streets in their policies and practices by providing them with technical assistance and funding.

Program performance:

Tracker target

Number of municipalities with approved Complete Streets policies

PfP tool forecast

Not forecasted in PfP

Other indicators

Number of Complete Streets policies to be enacted

FY2019-2023 program budget:

**\$50.0 million over
five years**



Intelligent Transportation Systems

Program purpose and need statement:

This program supports innovative and new communication equipment and information technology systems (signs, cameras, sensors, etc.) designed to provide real time traffic information to residents and visitors. This program is necessary to improve our network of communication tools to allow drivers to make better informed decisions regarding travel options.

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP
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Other indicators	Travel time from Real Time Traffic Management (RTTM)
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FY2019-2023 program budget:

\$81.6 million over five years

Intersection Improvements

Program purpose and need statement:

This program upgrades and improves traffic signals and intersections. This program is necessary to meet safety improvement targets.

Program performance:

Tracker target	2018 – 0.63 fatalities; 6 injuries* 2020 - 0.62 fatalities; 6 injuries* Long term – move to zero
-----------------------	--

PfP tool forecast	Under development
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Other indicators	To be determined
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FY2019-2023 program budget:

\$180.8 million over five years

** Tracker target per 100 million vehicle miles traveled (VMT)
*Equivalent Property Damage Only



Roadway Reconstruction

Program purpose and need statement:

This program improves the overall condition of roads, by supporting both large and small state and municipal investments. Nearly all of the projects in this program include improvements to bicycle and pedestrian user spaces.

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP
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Other indicators	Pavement condition; crash data
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FY2019-2023 program budget:

\$1,418.6 million over five years

Allston Multi-Modal Implementation

Program purpose and need statement:

This program reconstructs and realigns the Allston interchange to improve safety for all transportation modes: walking, cycling, driving, transit and to create a vibrant Allston neighborhood reconnecting sections to each other and to the Charles River.

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP
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Other indicators	To be determined
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FY2019-2023 program budget:

\$16 million over five years*

**For design and permitting; does not include construction.*



Modernization programs for IT

Customer Digital Experience

Program purpose and need statement:

This program ensures that MassDOT and MBTA websites present clear, concise, and timely information to the public at all times. This program is necessary to ensure that transportation system users have successful interactions with MassDOT or MBTA public facing websites.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP

Other indicators

Monitor budgets and scheduled deliverables. Help Desk and Incident Report activity 100% of websites updated and aligned with Commonwealth standards.

FY2019-2023 program budget:

\$10.0 million over five years

Enterprise / BPR* / Automation

Program purpose and need statement:

This program improves the ways that MassDOT manages and optimizes core functionality (such as document management, file shares, workflows, etc.) through business needs analysis and the implementation of enterprise solutions that are scalable, resilient and have an extensive ecosystem.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP tool

Other indicators

Monitor budgets & scheduled deliverables. Full implementation of critical finance, HR and legal systems.

FY2019-2023 program budget:

\$19.5 million over five years

**Business Process Re-engineering*

Workforce Productivity

Program purpose and need statement:

This program improves business processes through automated workflows and other electronic means at the department level. This program also may include investments that improve process timelines, reduce paperwork, and contribute to efficiency.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP

Other indicators

Monitor budgets and scheduled deliverables. Full implementation of departmental business process and workflows.

FY2019-2023 program budget:

**\$14.2 million over
five years**



Modernization programs for MBTA

Accessibility

Program purpose and need statement:

This program improves accessibility at MBTA commuter rail, subway and bus stations. This program is necessary to meet the goals of the Authority's Plan for Accessible Transit Infrastructure ("PATI").

Program performance:

Tracker target

Not established - platform accessibility

PfP tool forecast

87% of the stations ADA compliant by 2022

Other indicators

Reduce barriers to accessibility

FY2019-2023 program budget:

\$265.0 million over five years

Risk Management and Mitigation

Program purpose and need statement:

This program implements risk management initiatives as well as proactive efforts to improve workplace safety and system security.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP tool

Other indicators

Implement MBTA Occupational Health and Safety Program

FY2018-2022 program budget:

\$177.1 million over five years



Process Improvements and Innovation

Program purpose and need statement:

This program includes investments in business process improvements and innovations that enhance productivity or quality of MBTA services and capital programs.

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP tool
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Other indicators	Under development
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FY2019-2023 program budget:

\$25.0 million over five years

Customer Experience and Technology

Program purpose and need statement:

This program includes improvement projects that modernize the system and enhance customer experience.

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP tool
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Other indicators	Under development
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FY2019-2023 program budget:

\$104.0 million over five years

AFC 2.0

Program purpose and need statement:

The AFC 2.0 program will implement a new reliable and convenient fare payment and collection system, integrated across all modes, to replace CharlieCards/Tickets and supporting hardware and software

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP tool
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Other indicators	Project-specific milestones
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FY2019-2023 program budget:

\$160.0 million over five years

Red Line/Orange Line Improvements

Program purpose and need statement:

The Red Line and Orange Line Improvement program includes the set of vehicle and infrastructure investments needed to fully modernize the fleet and achieve the service goal of three minute headways on both lines.

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP tool
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Other indicators	Project-specific milestones
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FY2019-2023 program budget:

\$1,565.7 million over five years

Commuter Rail Safety and Resiliency

Program purpose and need statement:

This program includes projects that improve the safety and resiliency of the Commuter Rail network, including the implementation of Positive Train Control.

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP tool
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Other indicators	Project-specific milestones
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FY2019-2023 program budget:

\$637.5 million over five years

Modernization programs for Rail

Facility modernization

Program purpose and need statement:

This program repairs or replaces rail facilities, specifically rail yards and stations, to upgrade them to current industry standards or maintain the facility's utility. Prioritization of projects in this program will reflect economic opportunities for the line served, condition reports, type of risk/usage, and any contractual or regulatory requirements for action and consistency with the Statewide Rail Plan. This program is necessary to maintain a safe, reliable, cost effective, and modern rail system.

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP tool
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Other indicators	To be determined
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FY2019-2023 program budget:

**\$13.25 million over
five years**

Industrial Rail Access Program

Program purpose and need statement:

This program makes investments in private sector rail lines to leverage private investment that will increase freight rail usage or will modernize an active line to increase the utility to customers.

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP tool
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Other indicators	To be determined
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FY2019-2023 program budget:

**\$15.0 million over
five years**

Track and right-of-way modernization

Program purpose and need statement:

This program repairs or replaces assets within the rail right of way (typically ties, rail, ballast, switches, etc.) to upgrade their capacity to reflect current industry standards (ie: weight capacity to 286,000 lbs) for the line and maintain the line's utility. Prioritization of projects in this program will reflect economic opportunities for the line, most recent inspections, type of usage (ie: hazardous cargo), any contractual or regulatory requirements for action, and consistency with the Statewide Rail Plan. A consultant has been retained to develop an asset management system for Rail that will be used to inform future investment decisions.

Program performance:

Tracker target	Not established in Tracker
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PfP tool forecast	Not forecasted in PfP tool
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Other indicators	To be determined
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FY2019-2023 program budget:

**\$31.1 million over
five years**

Modernization programs for Registry

ATLAS

Program purpose and need statement:

This program improves RMV service delivery options by replacing the ALARS system. This program is necessary to increase business process efficiency through reduced wait times, increase the number of transactions done via alternative customer service channels, and increase the capacity of third parties dependent on RMV data.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP tool

Other indicators

ATLAS replaces the 30 year old mainframe system known as ALARS. ALARS is dated in technical and user interface terms, is expensive to maintain and lacks flexibility to update as business requirements change.

FY2019-2023 program budget:

\$61.5 million over five years

Customer service modernization

Program purpose and need statement:

This program includes updating and upgrading leased branch locations to accommodate the new dual line queuing model, signage, furniture and fixtures.

Program performance:

Tracker target

Percent of Service Center customers served in 30 minutes or less. Reduces the percent of customers served in Service Centers statewide waiting 60 minutes or more to be served.

PfP tool forecast

Not forecasted in PfP tool

Other indicators

Modernizing the RMV's Service Centers through wayfinding, queuing systems, and appropriate layouts is a critical element in meeting wait time and customer service performance standards.

FY2019-2023 program budget:

\$3.8 million over five years



Alternative Service Channels/Kiosks

Program purpose and need statement:

This program supports customer use of alternative service channels, including self-serve kiosks which may be introduced in FY2020-FY2021. Serving customers outside of an RMV Service Center is critical to meeting wait time goals

Program performance:

Tracker target

Percent of system-wide transactions conducted outside of Service Centers

PfP tool forecast

Not forecasted in PfP tool

Other indicators

Online transaction options, 3rd parties, and kiosks help to increase the number of customers served in Service Centers in 30 minutes or less by decreasing the customer volume of in-person visits.

FY2019-2023 program budget:

\$2.25 million over five years

Modernization programs for Transit

RTA facility and system modernization

Program purpose and need statement:

This program improves or modernizes existing RTA facilities, systems or equipment.

Program performance:

Tracker target Not established in Tracker

PfP tool forecast Not forecasted in PfP tool

Other indicators To be determined

FY2019-2023 program budget:

\$26.3 million over five years

RTA fleet upgrades

Program purpose and need statement:

This program allows for Regional Transit Authority fleet growth. This program is necessary to meet service needs or expansion.

Program performance:

Tracker target Not established in Tracker

PfP tool forecast Not forecasted in PfP tool

Other indicators To be determined

FY2019-2023 program budget:

\$0.0 million over five years

RTA Replacement Facilities

Program purpose and need statement:

This program constructs modernized RTA maintenance, administrative, operations or intermodal facilities.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP tool

Other indicators

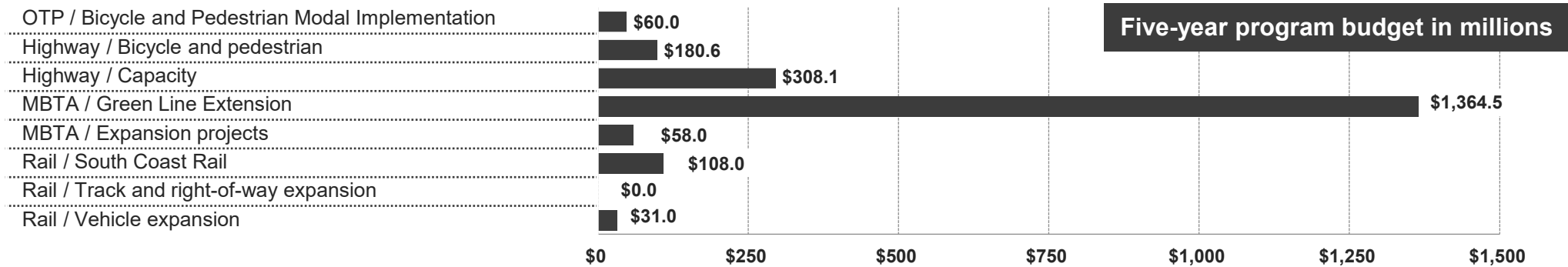
To be determined

FY2019-2023 program budget:

**\$16.4 million over
five years**



Expansion investments by program



Highway	MBTA	Rail	OTP	Total SFY19 23
\$488.7 (millions)	\$1,422.5	\$139.0	\$60.0	\$2,110.2

Expansion programs for Highway Bicycle and Pedestrian Capacity

Program purpose and need statement:

This program constructs multi-use paths and other trails that are independent from a roadway. In addition, this program will meet future needs identified through the ongoing statewide bicycle and pedestrian planning efforts.

Program performance:

Tracker target Under development

PfP tool forecast 1,041 miles of off-road bicycle and pedestrian facilities

Other indicators To be determined

FY2019-2023 program budget:

\$180.6 million over five years

Program purpose and need statement:

This program adds new connections or expands the existing transportation network.

Program performance:

Tracker target Not established in Tracker

PfP tool forecast Not forecasted in PfP tool

Other indicators To be determined

FY2019-2023 program budget:

\$308.1 million over five years

Expansion programs for MBTA

Expansion Projects

Program purpose and need statement:

This program makes investments in targeted expansions in order to improve access to transit, including the Silver Line to Chelsea and Blue Hill Avenue Station on the Fairmount Line and South Coast Rail.

Program performance:

Tracker target Not established in Tracker

PfP tool forecast Not forecasted in PfP

Other indicators To be determined

FY2019-2023 program budget:

\$58.0 million over five years

Green Line Extension

Program purpose and need statement:

The Green Line Extension program includes the vehicles, stations and infrastructure to extend the Green Line from a relocated Lechmere Station in East Cambridge to Union Square in Somerville and College Avenue in Medford.

Program performance:

Tracker target Not established in Tracker

PfP tool forecast Not forecasted in PfP tool

Other indicators To be determined

FY2019-2023 program budget:

\$1,364.5 million over five years

Expansion programs for OTP

Bicycle and Pedestrian Multi-Modal Implementation

Program purpose and need statement:

This program will meet needs identified through the statewide bicycle and statewide pedestrian planning efforts. The plans address critical needs around safety, accessibility, network connectivity and maintenance.

Program performance:

Tracker target

Under development

PfP tool forecast

Not forecasted in PfP tool

Other indicators

To be determined

FY2019-2023 program budget:

**\$60.0 million over
five years**



Expansion programs for Rail

Track and right-of-way expansion

Program purpose and need statement:

This program repairs or replaces assets within the rail right of way (typically ties, rail, ballast, switches, etc.) to expand existing rail services, including the addition of passenger rail or freight rail. Prioritization of projects in the program will reflect economic opportunities for the new service, consistency with the Statewide Rail Plan, and any contractual or regulatory requirements for action.

Program performance:

Tracker target Not established in Tracker

PfP tool forecast Not forecasted in PfP

Other indicators To be determined

FY2019-2023 program budget:

\$0.0 million over five years

Vehicles expansion

Program purpose and need statement:

This program repairs, replaces, or acquires rail equipment (locomotives, coaches, ballast cars, light duty vehicles, etc.) to expand existing rail services, including the addition of passenger rail or freight rail. Prioritization will reflect economic opportunities for the new service, consistency with the Statewide Rail Plan, and any contractual or regulatory requirements for action.

Program performance:

Tracker target Not established in Tracker

PfP tool forecast Not forecasted in PfP tool

Other indicators To be determined

FY2019-2023 program budget:

\$31.0 million over five years

South Coast Rail

Program purpose and need statement:

This program funds the Commonwealth's commitment to move forward with the South Coast Rail project to serve the existing and future demand for public transportation between Fall River/New Bedford and Boston, and to enhance regional mobility and support smart growth planning and development strategies in Southeastern Massachusetts.

Program performance:

Tracker target

Not established in Tracker

PfP tool forecast

Not forecasted in PfP tool

Other indicators

To be determined

FY2019 program budget:*

\$ 108.0 million

*Pending development of finance plan;
includes FY 19 SCR program budget for
both Rail and MBTA

About project lists

The full list of investments is presented by Division. The information within each column is described below:

- **Location** – where the investment is located
- **Project ID** – the Division specific ID that uniquely identifies each investment
- **Project name** – the name of the investment and a brief description
- **Priority** – the capital priority that the investment addresses
- **Program** – the program from which the investment is made
- **Score** – the score of the investment (reliability investments are not scored)
- **Total cost** – the total cost of the investment
- **Prior years** – the spending on the investment that pre-dates the plan update
- **FY 2019** – the spending estimated to occur in fiscal year 2019
- **FY 2020-2023** – the spending estimated to occur in the out years of the plan
- **Post-CIP** – the spending estimated to occur beyond the plan horizon

Equity analysis

The social equity analysis was conducted to establish compliance with federal and state nondiscrimination laws and regulations, including Title VI of the Civil Rights Act of 1964 (Title VI), the Civil Rights Restoration Act of 1987, and the 1994 Presidential Executive Order 12898 on Environmental Justice. The analysis evaluated investments per capita at the municipal level due to the methodology used to create the CIP's project universe. While municipalities were the only geographic level analyzed, equitable investment was evaluated using a number of different variables and indicators. The most significant variables used to draw conclusions are:

- MassDOT investments, which incorporates all capital investments within MassDOT's divisions; and
- All CIP investments, which includes all of the capital investments within both MassDOT and the MBTA.

Equity analysis in process

Geographic equity

Analysis and update in process

As a state agency, MassDOT seeks to fund transportation infrastructure equitably across the state. However, because of the data that is available and the nature of transportation infrastructure, there is no clear consensus on what exactly is an equitable distribution of resources, given the variation between needs, demand, and contributed tax dollars. As a result, MassDOT assessed the data in a variety of ways for this equity analysis. The maps included in this section illustrate a few different ways that MassDOT assessed the data. While no single method is perfect, these approaches, taken together, provide useful information to better understand the regional distribution of resources. Since this Capital Investment Plan is a one year update, projects currently underway are excluded from the analysis. Only projects programmed within SFY 2019-2023 in the Plan are considered.

Some of the variables considered in analyzing the geographic equity of the plan include population, lane miles, Chapter 90 ratio, and Regional Transit Authority (RTA) ridership. Population is considered to evaluate investment per capita and lane miles is considered as a proxy to evaluate demand for roadway maintenance and improvements. Similarly, RTA ridership is used as a proxy to measure the need and demand of transit investments.

The Chapter 90 Program is a formula program distributed to municipalities for roadway improvements based on population (20.83%), employment (20.83%), and lane miles (58.33%). This formula can serve as a benchmark against which MassDOT Highway funding should be distributed and as a proxy for an appropriation distribution for all non-transit MassDOT projects. Because of concerns with just looking at population or at lane miles, this formula is an opportunity to consider both variables. As the formula is already in use throughout the Commonwealth, MassDOT opted to use the given percentages as an acceptable measure for an equitable distribution of investments.

Geographic equity

If the ratio of CIP funding allocated to a municipality is the same as the ratio of Chapter 90 funding it receives – meaning a ratio of one – this would indicate that the CIP distribution is equitable. Greater than one would indicate more CIP funding than would be expected if funding were distributed according to the Chapter 90 formula, less than one would mean that the CIP distribution provides less than would have been received if the Chapter 90 formula were in use.

Each of the maps shows a different story about the geographic distribution of funding. The ratios presented in the maps illustrate what the expected investments would be in each community were the plan perfectly equitable across municipalities or RTAs. The shading indicates the variations in investments from that expected investment.

Social equity

A social equity analysis was conducted by considering the distribution of investments across all municipalities, and across different demographic indicators, such as minority, low-income, and limited English proficiency (LEP). Minority municipalities are defined as those with populations that are at least 23.87 percent people of color, which is the statewide average. Low-income municipalities are defined as municipalities with a median household income at or below 65 percent of the statewide median household income. The statewide median household income is currently \$67,846. Therefore, low-income municipalities are defined as those with median household incomes of \$44,100 or less, regardless of household size. Few municipalities in Massachusetts qualify as low-income; those that do meet the definition are mainly densely populated urban communities and scarcely populated rural communities. Communities with at least 5% of their population considered limited English proficient (LEP) were also considered for social equity implications. United States Department of Transportation guidance defines limited English proficient persons as “individuals who do not speak English as their primary language and who have a limited ability to read, write, speak, or understanding English.” Since this Capital Investment Plan is a one year update, projects currently underway are excluded from the analysis. Only projects programmed within SFY 2019-2023 in the Plan are considered.

Analysis and update in process

Comments tab

- MassDOT and the MBTA want to hear from you about this draft CIP update! We have provided you with three ways to share your comments:
 - Attend a CIP public meeting - see map to the right for details
 - Use the investment map below to find a project to comment on
 - Comment on the draft CIP update using our comment tool
- For this CIP update, there was three pronged approach to public and stakeholder engagement. Phase 1 focused on stakeholder engagement with established stakeholders and groups as well as the identification of new, stakeholders across all MassDOT and MBTA divisions. In addition, social media was utilized to highlight transportations investments completed under prior CIPs as well as ongoing efforts under the 2019-2023 CIP.
- Phase 2 will focus on input from the general public through the online commenting tool and public meetings across the Commonwealth (consistent with past years). Finally, all comments are analyzed using qualitative data analysis software and relevant comments are provided to divisions for further input and response. Major themes are documented and incorporated as part of the final CIP.
- Your input into the capital planning process is invaluable. We consider all of the comments we receive when shaping the investment strategies and projects chosen for funding.